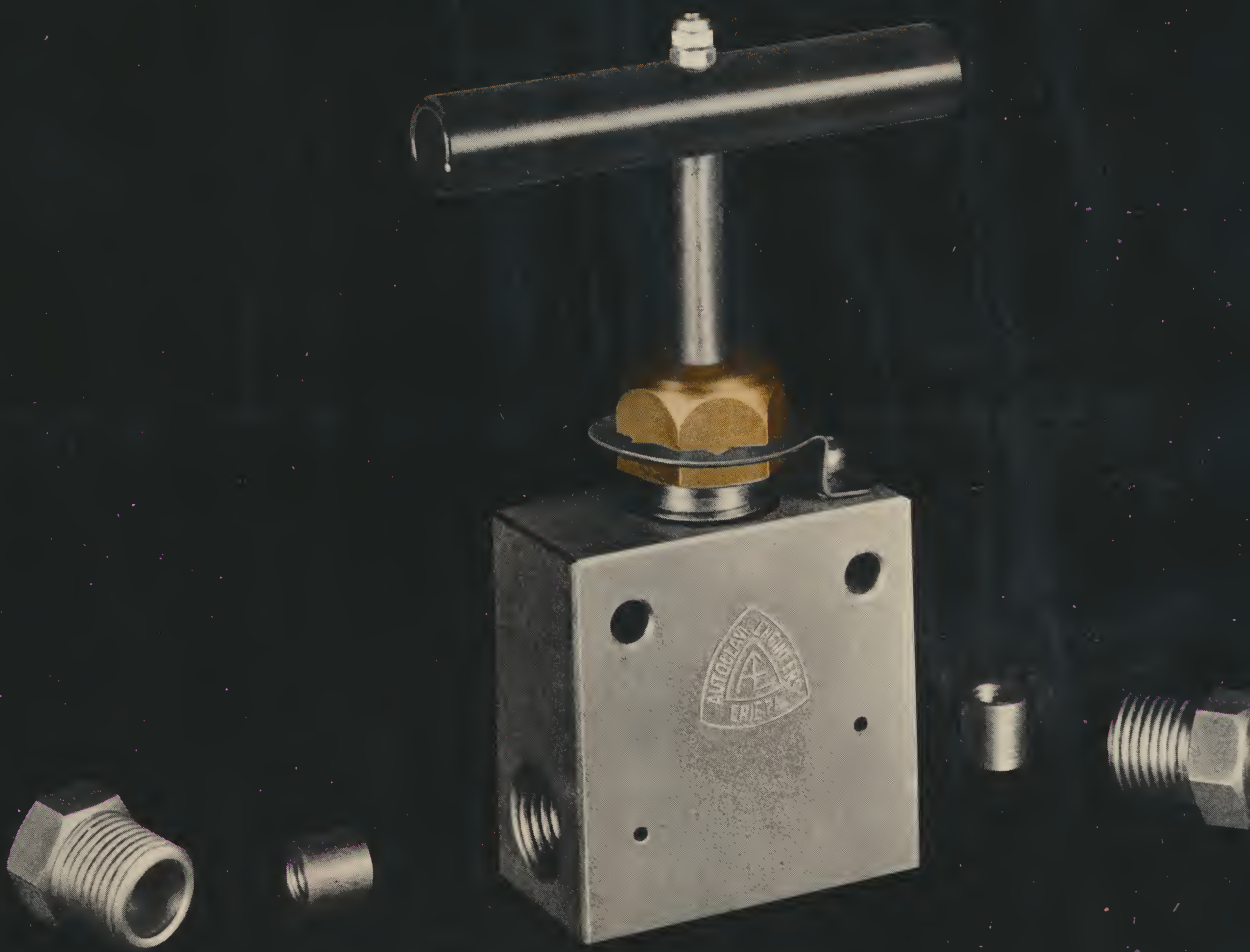
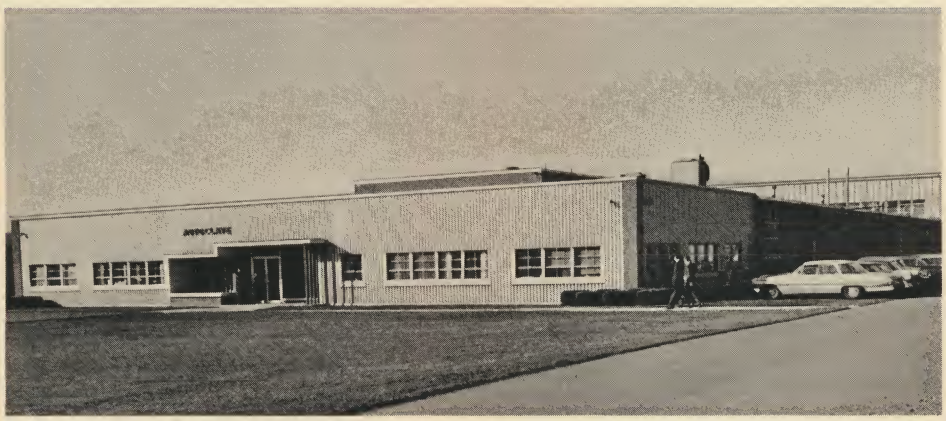
CATALOG NO. 500

AUTOCLAVE
ENGINEERS, INC.

HIGH PRESSURE VALVES & FITTINGS





This catalog lists and illustrates the standard valves and fittings offered by Autoclave Engineers, Inc.

For those circumstances where special design or material requirements prohibit the use of standard items, our design engineers will be pleased to work with you to develop equipment appropriate to the application.

AUTOCLAVE ENGINEERS, INC. · ERIE, PA.

AUTOCLAVE ENGINEERS
VALVES AND FITTINGS

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MANUFACTURING AND QUALITY CONTROL FACILITIES

Since its founding in 1945, Autoclave Engineers has led the development and improvement of high pressure valves and fittings for use in research and manufacturing applications. New and better designs have evolved, and older designs have been improved as new and better materials have become available and as knowledge of material properties and service requirements has expanded.

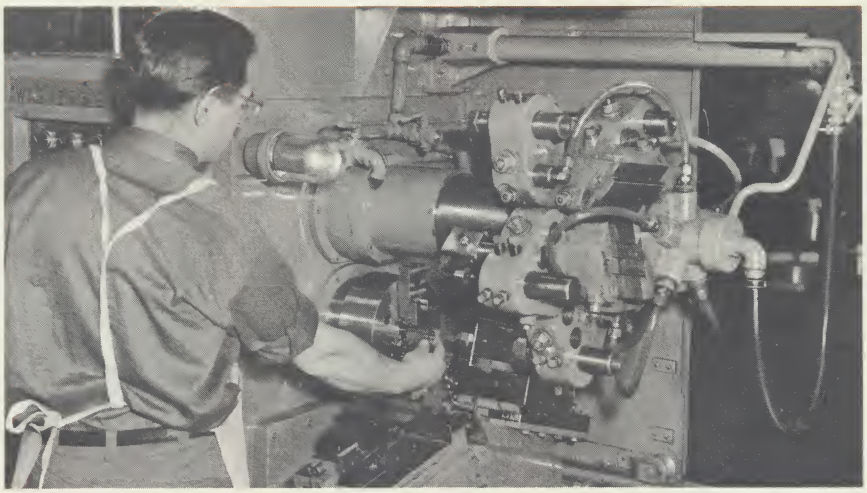
Equally significant has been our concentration on securing the finest of modern tooling to assure our ability to meet the increasing demands of high pressure applications. Modern high speed, precision machines and the finest of tools, carefully maintained at top efficiency, provide maximum precision while permitting a substantial offset to increasing material and labor costs.

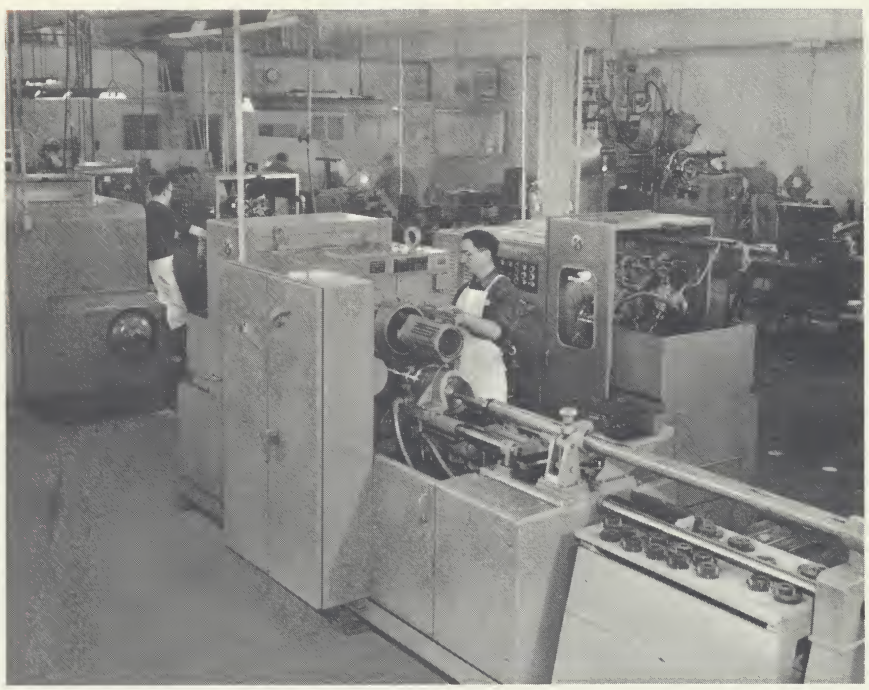
The photographs on these pages illustrate the careful attention to manufacturing efficiency which represents the user's best assurance of consistently high quality and trouble-free performance at moderate cost.

In evaluating high pressure equipment, there is no substitute, other than potentially costly trial and error, for the manufacturer's reputation. Autoclave Engineers' acknowledged leadership is founded in a sincere determination to manufacture and market, without compromise, "The finest tools for high pressure technology."

Designs and material specifications are carefully established and tested by AE Design and Development engineers.

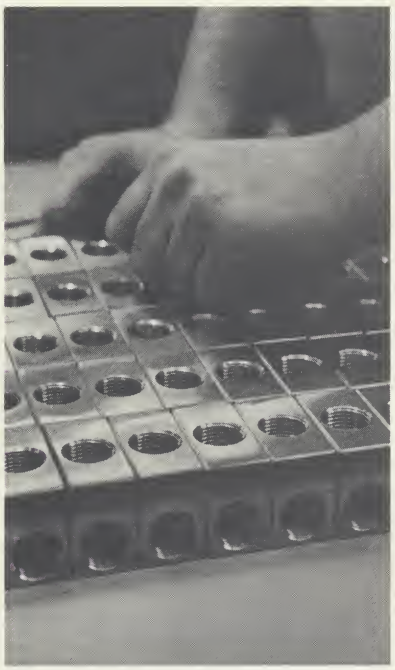
After production is authorized, raw material, purchased from America's leading suppliers, is carefully checked for conformance to AE specifications and color coded for identification. Complete "physicals" are available on all AE valves and fittings, when required.



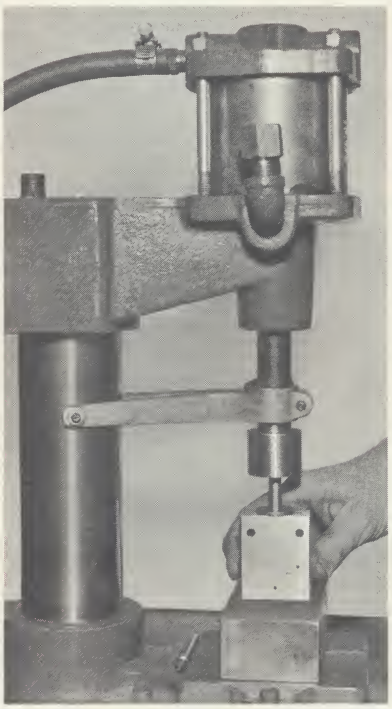


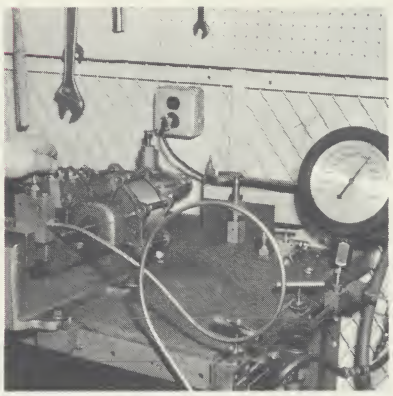
These high-speed, precision chucking and bar-feed automatic turret lathes are the keys to the high quality and moderate cost of Autoclave Engineers valves and fittings.

Cutting tools are carefully maintained in this precision tool grinding department to assure dimension and finish control.

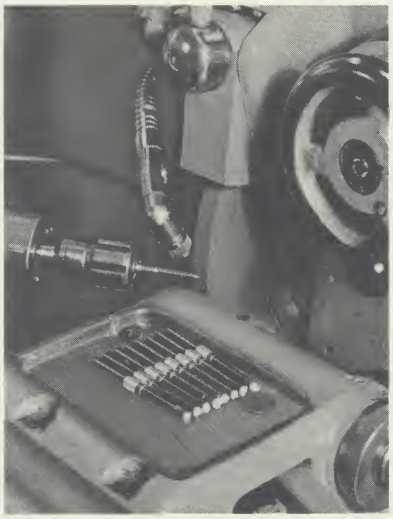


All components of AE valves and fittings are carefully deburred by skilled personnel and individually inspected against rigid standards prior to assembly.





All valve seats are "coined" prior to assembly to assure proper seat finish and hardness for dependable shut-off. After assembly, every valve is hydrostatically tested to a pressure 50% higher than the rated working pressure. A substantial random sampling of valves is also gas tested to assure efficient gas system performance.



All AE valve stems have rolled threads for smooth, low friction operation. Stem tips and shanks are precision ground to close tolerances to assure easy and dependable shut-off and long-term, leak-free packing life.

Completed assemblies or components for all valves and fittings shown in this catalog are stocked in substantial quantities so that orders may be filled and shipped promptly.

HIGH PRESSURE CONNECTIONS

Tubing and tubing connections have gained universal acceptance in high pressure work. Leak-proof joint "make-up" can be easily accomplished and every connection is a union type joint.

Before an intelligent selection of valves and fittings can be made, an understanding of the connections most frequently used in high pressure work is necessary.

In some cases, there may be no choice but to use auxiliary equipment equipped with pipe threads. Under these conditions, it is advisable to adapt to a tubing connection immediately as tapered pipe threads are difficult to seal against high pressure and thread galling is an ever-present hazard.

AE ERMETO CONNECTIONS

The Ermeto connection was introduced to the high pressure field by Autoclave Engineers, Inc. in 1950. Since then, it has become the standard connection for use at pressures up to 15,000 psi. It consists of four parts—a tapered female seat, tubing, sleeve and gland. Assembly is quick and easy—the gland and sleeve are slipped on a pre-cut length of specially annealed tubing; these three elements are then inserted into the female connection, and the gland is tightened. No special tools are required. The thrust produced by tightening the gland forces the sleeve into the tapered female seat. This, in turn, forces the inner edge of the sleeve to cut into the tubing—creating a shoulder for positive mechanical support of the tubing end load. The Ermeto connection is the most dependable, easy-to-use connection of its type. It is featured in AE Speed valves. (*See page 9.*)

SLIM-LINE ERMETO CONNECTIONS

AE Slim-Line Ermeto connections feature these same principles and advantages. They are, however, designed to correlate more closely with the application requirements imposed by the various tubing sizes and pressure ratings with which they are used. A substantial reduction in size and cost has been achieved with no sacrifice of significant safety factors. These connections are used in SpaceSaver valves and Application-Engineered Ermeto fittings. (*Page 8.*)

ERMETO® CONNECTION NOMENCLATURE

SWM refers to *male* Slim-Line Ermeto connections; SW refers to *female* Slim-Line Ermeto connections.

Type Connection	Ermeto	Ermeto	Slim-Line Ermeto	Ermeto	Slim-Line Ermeto	Slim-Line Ermeto
Connection Nomenclature	W125	W250	SWM250 SW250	W375	SWM375 SW375	SWM500 SW500
Standard Tubing — O.D.	⅛"	¼"	¼"	⅜"	⅜"	½"
Standard Tubing — I.D.	1/16"	⅛"	⅛"	¼"	¼"	⅜"
Pressure Rating — P.S.I.	15,000	6,000	6,000	6,000	6,000	4,000

For engineering details, see page 36

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AE-CONE CONNECTIONS

The AE Cone Connection was developed by the U. S. Nitrogen Fixation Laboratory and has served research and production for over 40 years. The male and female cones, machined to slightly different angles, bear on each other through essentially a line contact. Thus, the metal to metal sealing contact area is reduced to a minimum, providing adequate unit stresses for effective sealing with only moderate tightening. This connection has fewer elements and fewer areas of sealing contact than *any* of the compressed-ferrule type tubing connections. Consequently, the potential for leakage resulting from differential thermal expansion is materially reduced and higher pressures can be handled with less tightening.

Installation is quick and dependable. The coning and threading operations required on the end of the tubing can be accomplished with simple hand tools or on conventional lathes. Hand tools made by Autoclave Engineers permit coning and threading at the job site. (*See page 29.*)

Assembly consists of slipping the gland onto the tubing, threading the collar onto the tubing, inserting the tubing, collar and gland into the female connection, and tightening.

Autoclave Engineers employs this design in the AE-30, AE-60 and AE-100 valves and fittings. (*See pages 10-11.*)

AE SLIM-LINE CONE CONNECTIONS

The Slim-Line concept has also been applied to the cone connection with the same size and cost advantages as with Slim-Line Ermeto connections. The Slim-Line cone connection is employed in AE Slim-Line 9/16" O.D. series of valves and fittings. (*Page 10.*)

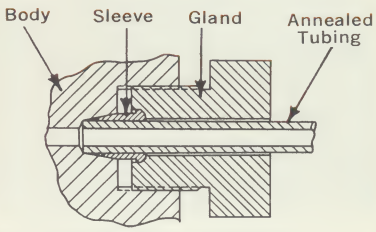
AE-CONE CONNECTION NOMENCLATURE

Type Connection	AE-Cone	AE-Cone	AE-Cone	AE-Cone	Slim-Line Cone
Connection Nomenclature	F250C	F312C100	F375C	F562C	SF562CX
Standard Tubing — O.D.	¼"	5/16"	⅜"	9/16"	9/16"
Standard Tubing — I.D.	.083"	1/16"	⅛"	3/16"	5/16"
Pressure Rating — P.S.I.	60,000	100,000	60,000	60,000	15,000

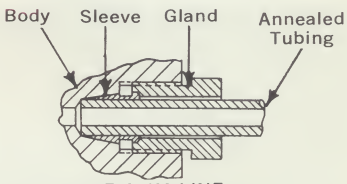
For engineering details, see page 37

AE GASKET TYPE CONNECTIONS

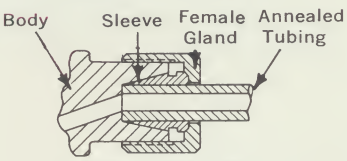
It is desirable to design pressure vessel connections so tubing seats can be renewed without expensive remachining of the vessel itself. It is also desirable to make provisions for different types and sizes of tubing connections so these may be changed as service conditions require. Autoclave Engineers provides these added benefits, whenever space permits, by using the connections illustrated here in conjunction with adapters in which the desired tubing connection is provided. These connections require substantially higher torques then the tubing connections discussed on these pages but this requirement is used to advantage to help lock the adapter in place during normal installation and removal of tubing.



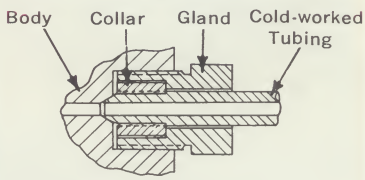
AE ERMETO CONNECTION



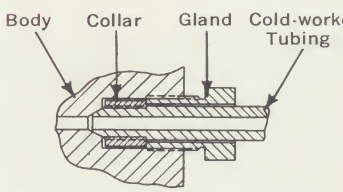
AE SLIM-LINE ERMETO CONNECTION



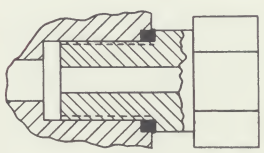
AE MALE SLIM-LINE ERMETO CONNECTION

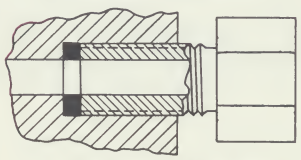


AE CONE CONNECTION



AE SLIM-LINE CONE CONNECTION


FLAT TOP ADAPTER
Gasket above threads


FLAT BOTTOM ADAPTER
Gasket below threads

SELECTION OF VALVE STEMS

All high pressure valve stems share certain requirements which influence stem performance.

- Operating thread should be above the packing to protect it against corrosion.
- Positive action without "back-lash" or "loss of feel" must be provided.
- Concentricity must be maintained between the stem and associated valve members to ensure accurate seating of the stems for positive shut-off.
- Stem tolerances must be carefully controlled to prevent packing extrusion.
- High quality surface finish is necessary for long packing life.
- Material specifications must provide proper hardness, strength, and corrosion resistance.

Careful attention to all these considerations has contributed to the unique acceptance of AE valves.

ONE-PIECE OR TWO-PIECE STEMS?

If the valve stem rotates against the valve seat during opening and closing, these elements must be of dissimilar materials to reduce or prevent the effects of abrasion and galling. These considerations must take precedence over corrosion resistance.

A stem which does not rotate against its seat avoids these problems and the portion subjected to the process stream can be of the same material as the valve body for maximum corrosion resistance. This can be accomplished only by making the valve stem of two or more pieces so the mechanical advantage of the screw can be utilized for easy operation under high end loads while the portion which passes thru the packing and accomplishes sealing contact with the seat is prevented from turning on the seat.

This raises a new problem, however, because inadequate efficiency in the linkage of the multiple parts can produce "back-lash" and "loss of feel" which make it difficult for the operator to control process flows effectively.

AE TWO-PIECE STEM (Pat. No. 2,887,293)

Autoclave Engineers has been successful in developing a two-piece stem which provides a nonrotating section in contact with the process stream and valve seat without the "back-lash" and "loss of feel" inherent in many designs.

By referring to the sectional illustration, it will be seen that proper adjustment of the preloading nut draws the assembly elements together to the point where clearances are eliminated. The bearing and thrust washers are outside the packing and are not subjected to the process environment. They can be made, therefore, of a material selected for its low coefficient of friction. They permit the stem sleeve to rotate freely about the stem when the latter is restrained from rotating by friction between the stem and the seat.

The material of the stem can be chosen for corrosion resistance and can be the same as the valve body material for maximum life. The standard material is 316 ss., but other materials can be used when needed. Although readjustment of the preloading nut is not required, generally, this can be accomplished very readily without disassembly of the valve or its removal from the system.

This two-piece stem is standard on *all* AE valves except the ⅛" Speed valve and the ⅛" SpaceSaver valve as shown in the Valve Selector Charts, *pages 14-19*.

AE TWO-PIECE TAPERED STEM

In some applications, more accurate control of flow is required than is possible with a needle-type stem. For these cases, Autoclave Engineers has available a two-piece tapered stem which can be used for both control and shut-off. This stem has a 2° taper at the tip in conjunction with a standard 60° section for shut-off. While it is not equivalent in the precision of flow control to the Micro-Metering Stem (described below), especially in the region of very small flows, it does offer substantially better control than the needle stem. This stem is available for *all* AE valves except the *AE-60* series and *AE-100* series, as shown in the Valve Selector Charts, *pages 14-19*.

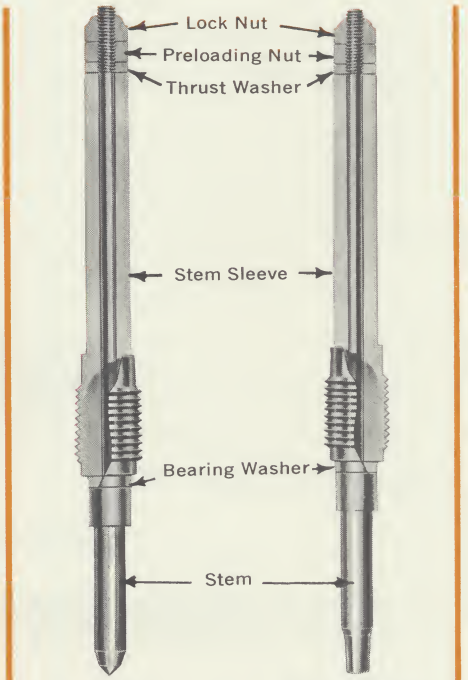
MICRO-METERING STEM

For applications where precise control of small flows is required, AE offers three special metering valves, *as shown on pages 9-11:* one for use in Ermeto systems, and two for use in AE-Cone systems. These valves employ a one-piece stem with a 2° taper at the tip and a very fine operating thread (¼" - 40 tpi.). Galling is not a problem as contact does not occur between the stem and seat in normal operation. Very fine, precise control is possible with these valves.

Caution! Valves employing this stem must not be used for shut-off service. A shut-off valve must be used in series when this action is required.

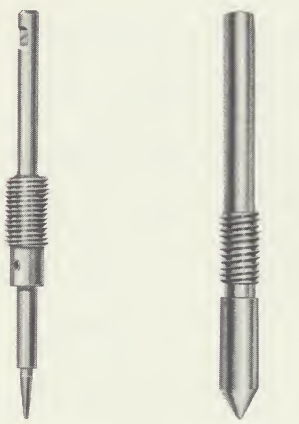
AE ONE-PIECE STEM

Because of space limitations, the ⅛" Speed valve and ⅛" SpaceSaver valve employ a one-piece stem made of 420 ss. with a specially hardened and polished tip.



AE TWO PIECE STEM

AE TWO-PIECE TAPERED STEM



AE MICRO-METERING STEM

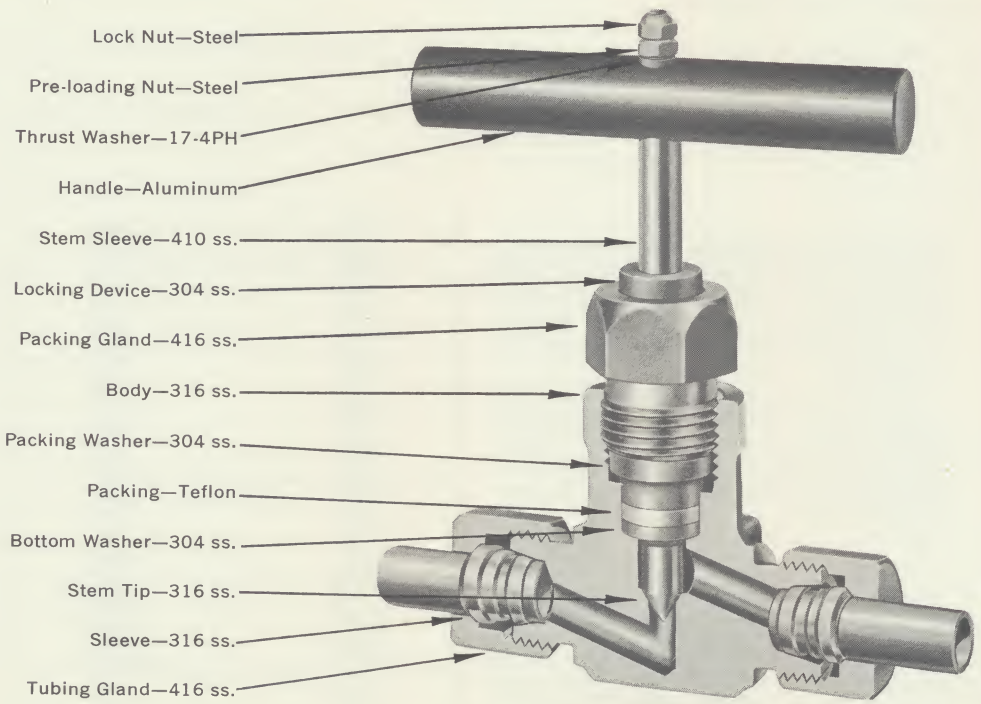
AE ONE PIECE STEM

VALVES AND FITTINGS WITH ERMETO CONNECTIONS

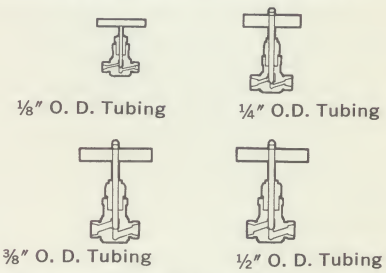
Quick, Dependable Make-up . . . No Welding . . . No Threading . . . No Special Tools . . . Every Joint a Union!

Since 1950, the AE Speed valve has been building a record of dependable and efficient operation and easy installation. Many of the nation's largest high pressure laboratories are equipped with this series for virtually all applications in the pressure range up to 15,000 psi.

The SpaceSaver series is a newer addition to Autoclave's line of high pressure valves with Ermeto connections. It has been thoroughly proved in many installations since it was introduced in 1957. The basic design principles are the same as in the Speed valve except that male connections have been employed to permit larger ports, and drop-forged bodies are smaller and lighter than bodies manufactured from bar stock.



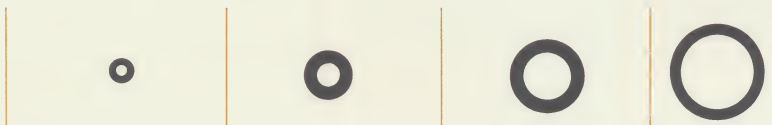
AVAILABLE IN FOUR SIZES



Male Connections for larger ports. Use U-Bolts for Rigid Mounting of SPACESAVER Valves.

SPACESAVER DROP FORGED VALVES

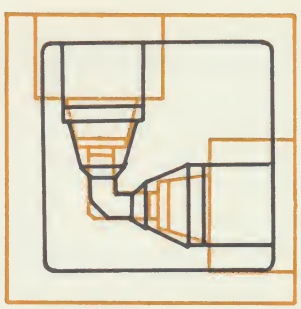
PRESSURE RATINGS, TUBING AND VALVE DESIGN SPECIFICATIONS FOR ALL AE ERMETO VALVES



Tubing Specification	ANNEALED, SEAMLESS 18-8 S.S. (SEE PAGE 27)						
Valve Series	SPEED	SPACE SAVER	SPEED	SPACE SAVER	SPEED	SPACE SAVER	SPACE SAVER
Connection Nomenclature	W125	SWM125	W250	SWM250	W375	SWM375	SWM500
Min. Valve Port Diameter	.094"	.094"	.125"	.110"	.125"	.188"	.250"
Tubing O.D.	⅛"		¼"		⅜"		½"
Tubing I.D.	1/16"		⅛"		¼"		⅜"
Pressure Rating	15,000 psi		6000 psi		6000 psi		4000 psi

For Ordering Information See Pages 14-26. • For Installation & Maintenance See Pages 42-49.
For Dimensions See Pages 36-41. • For Spare Parts & Materials Specifications See Pages 30-35.

Diaphragm air operators for on-off service available for ALL AE Ermeto valves
All AE Ermeto Valves and Fittings are supplied with the necessary glands and sleeves



AE APPLICATION-ENGINEERED FITTINGS

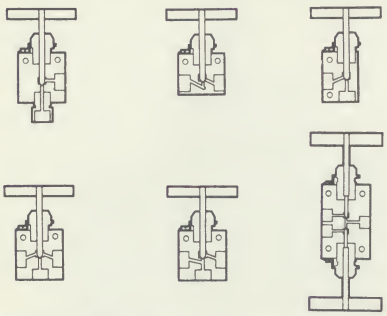
The development of Slim-Line Ermeto connections has permitted the design, to specific application requirements, of a new series of fittings . . . free of arbitrary design limitations. The result is substantial reduction in size and, even more important, savings ranging up to 35% over older style Ermeto fittings. As always with Autoclave Engineers, these fittings have been proved under actual service conditions in many installations prior to standardization. (*See pages 20-26 for the range of fittings offered.*)

VALVES AND FITTINGS WITH ERMETO CONNECTIONS

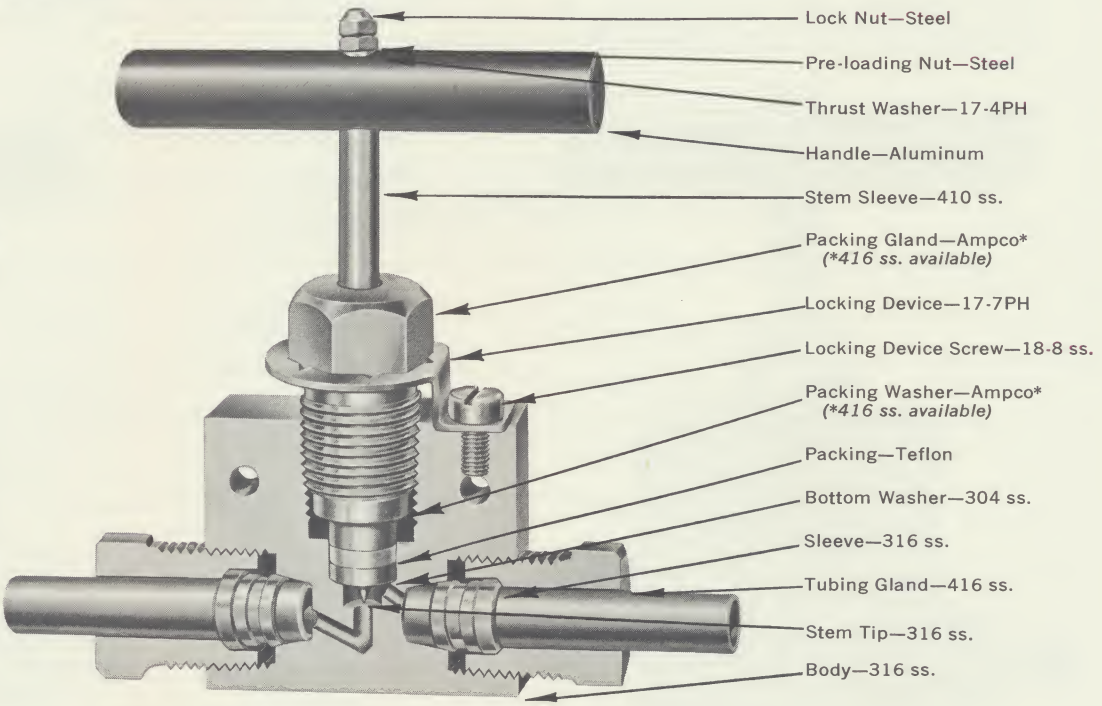
SpaceSaver valves and Speed valves share the following design features:

- Choice of two-piece, nonrotating, needle or tapered stem in all sizes except ⅛".
- Adjustable stuffing box for long-term, leak-free packing life.
- Locking device standard to prevent inadvertent unthreading of packing gland.
- Stem operating thread above packing for corrosion protection.
- In-line connections for easy layout and installation.

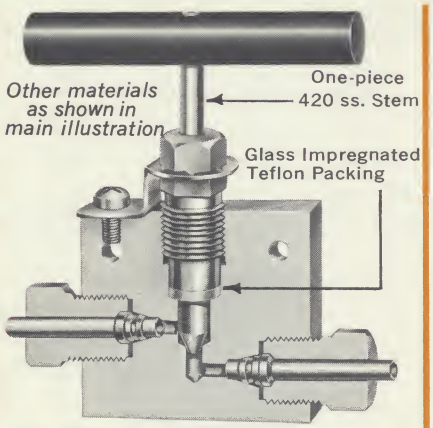
⅛", ¼", AND ⅜" SIZES AVAILABLE IN SIX BODY STYLES



Mounting holes standard on all AE Speed valves.

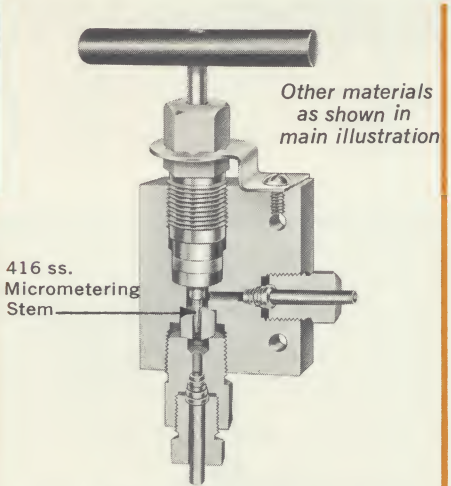


¼" AND ⅜" SPEED VALVES



⅛" SPEED VALVES

This new valve, especially suited to process instrumentation and bench scale research, incorporates all of the proved design features of the larger size Speed valves except that, because of the substantially smaller body size, space limitations require the connections to be offset for satisfactory port dimensions and the use of a one-piece stem. A complete range of fittings and accessories is offered in this size. (*See pages 20-26.*)

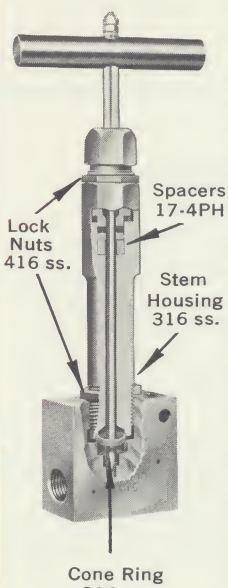


⅛" METERING SPEED VALVES

The hardened, 2° tapered stem with micrometering thread permits fine control of stem travel. (See Page 7.) Even closer control is possible by adding extension bar to threaded handle. The replaceable seat is of cold-worked 316 ss. . . . to minimize erosion and corrosion.

NOTE! *This valve must not be used for shut-off service.*

HIGH TEMPERATURE STUFFING BOX FOR ¼", ⅜" SPEED VALVES



By removing packing from the "hot" zone maximum valve service temperatures can be increased. Actual temperature at the packing (approximately 400° F with standard glass impregnated Teflon) is the limiting factor.

Normally process stream temperatures to 1000°F or higher can be handled with adequate valve body insulation and packing area ventilation. The AE two-piece stem design is used to eliminate stem and seat scoring.

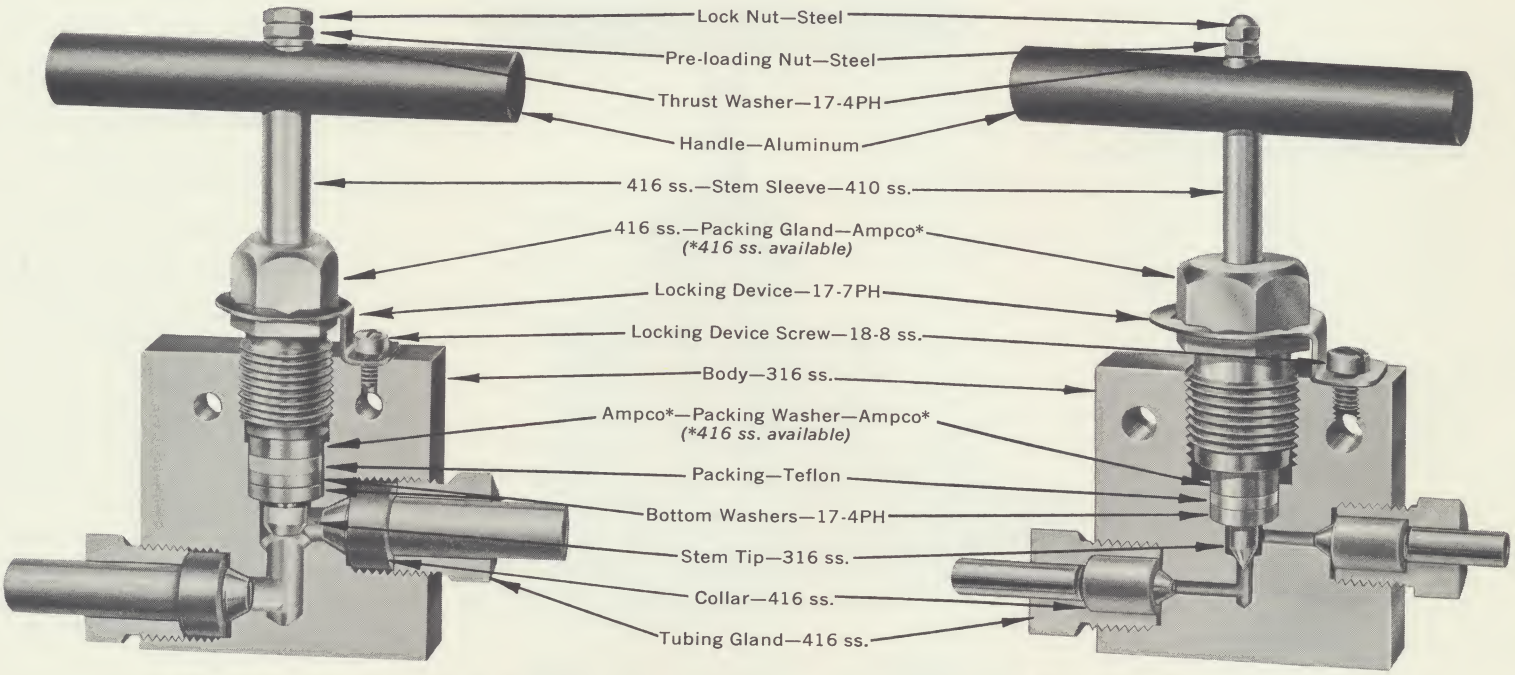
Other materials as shown in main illustration

VALVES AND FITTINGS WITH AE-CONE CONNECTIONS

For higher pressures, and for large port requirements above 4000 psi, Autoclave Engineers offers four series of valves, as illustrated on these pages.

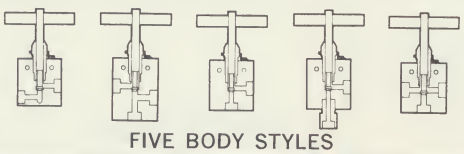
These are all valves which have been proved under actual service conditions in thousands of installations around the world over a period of many years. Simplicity of design and rugged precision construction provide valves which work easily and efficiently at extreme pressures. Careful material specifications provide the broadest corrosion resistance consistent with mechanical requirements.

The Slim-Line 9/16" O.D. Series, with its full 5/16" port, is the largest port "stock" valve with a pressure rating this high. It is particularly suited to pilot plant systems and to process sampling lines . . . wherever unrestricted high pressure flows are required. AE Slim-Line cone connections make body and over-all dimensions the smallest ever offered for these service conditions.



AE SLIM-LINE 9/16" O.D. SERIES
FULL 5/16" PORT — PRESSURE TO 15,000 psi

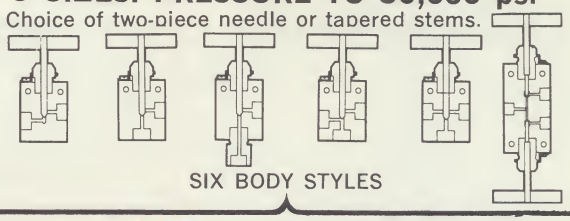
Choice of two-piece needle or tapered stems.



FIVE BODY STYLES

AE-30 SERIES
3 SIZES. PRESSURE TO 30,000 psi

Choice of two-piece needle or tapered stems.

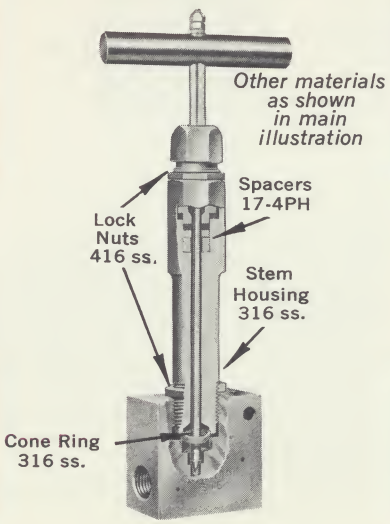


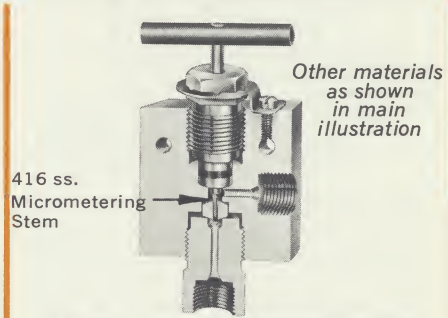
SIX BODY STYLES

HIGH TEMPERATURE STUFFING BOX FOR ALL AE-30 SHUT-OFF VALVES

By removing packing from the "hot" zone maximum valve service temperatures can be increased. Actual temperature at the packing (approximately 400° F with standard glass impregnated Teflon) is the limiting factor.

Normally process stream temperatures to 1000°F or higher can be handled with adequate valve body insulation and packing area ventilation. The AE two-piece stem design is used to eliminate stem and seat scoring.





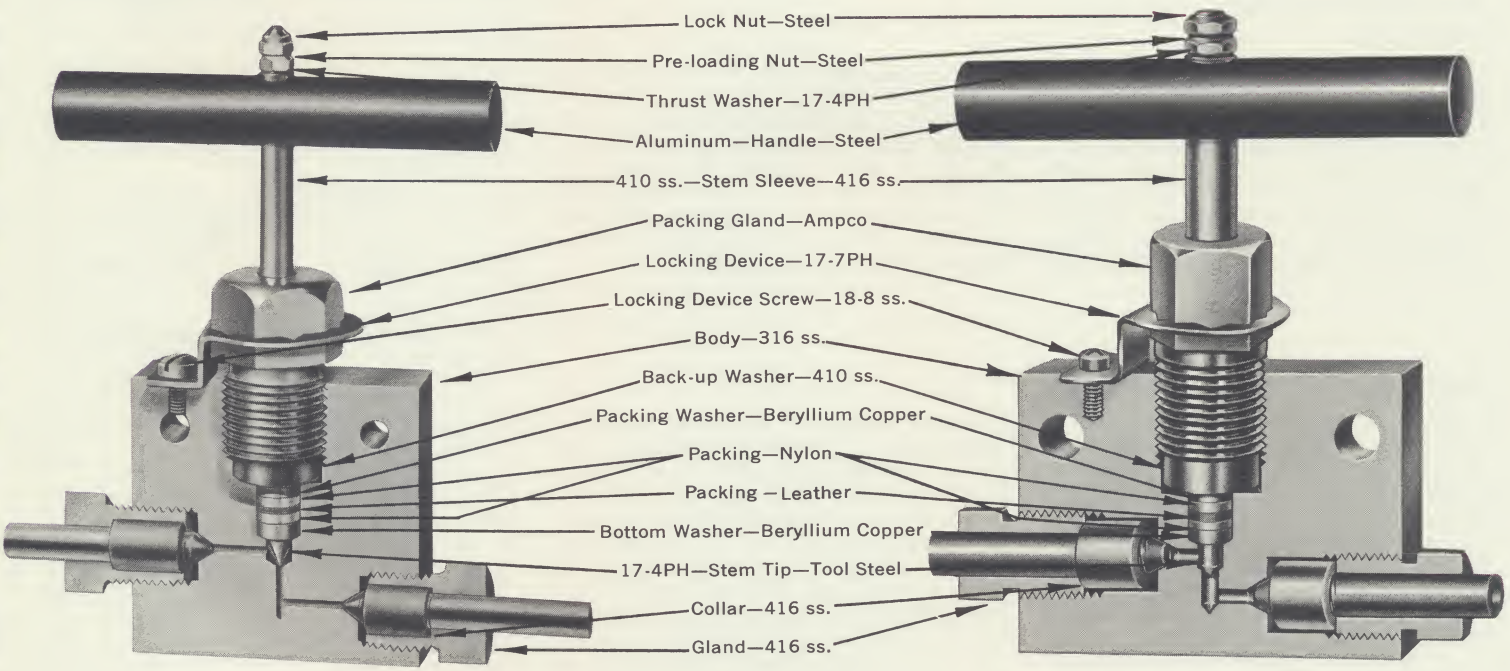
AE-30 — 1/4" METERING VALVE

The hardened, 2° tapered stem with micrometering thread permits fine control of stem travel. (See Page 7.) Even closer control is possible by adding extension bar to threaded handle. The replaceable seat is of cold-worked 316 ss. NOTE! *This valve must not be used for shut-off service.*

VALVES AND FITTINGS WITH AE-CONE CONNECTIONS

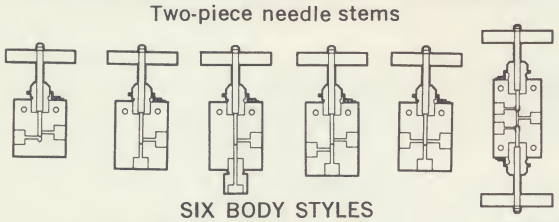
All of these valves share the design features listed below.

- Two piece nonrotating, needle stems for maximum wear and corrosion resistance. (Two-piece tapered stems also available in Slim-Line 9/16" and AE-30 series.)
- AE-Cone connections for dependable make-up with minimum tightening.
- Adjustable stuffing box for long-term, leak-free packing life.
- Off-set connections for larger port sizes.
- Mounting holes for rigid installation.
- Locking device to prevent inadvertent unthreading of packing gland.
- Complete line of fittings and accessories.



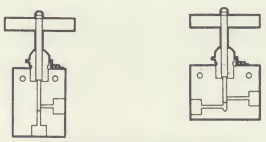
AE-60 SERIES
3 SIZES. PRESSURES TO 60,000 psi

Two-piece needle stems

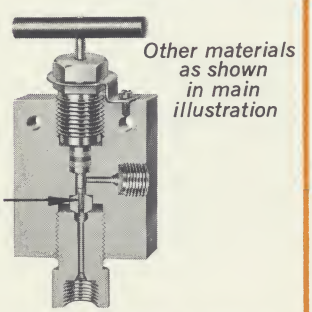


SIX BODY STYLES

AE-100 SERIES
5/16" O. D. X 1/16" I. D. CONNECTIONS FOR MORE SAFETY TO 100,000 psi



TWO BODY STYLES



AE-60 — 1/4" METERING VALVE

Basically the same as the AE-30 Metering Valve shown on page 9 except that leather and nylon packing is used as in the other AE-60 Valves shown above.

NOTE! *This valve must not be used for shut-off service.*

TUBING AND VALVE DESIGN SPECIFICATIONS — ALL SERIES

Tubing Specification	COLD WORKED, SEAMLESS 18-8 S.S. (SEE PAGE 27)							
Valve Series	AE-30	AE-60	AE-100	AE-30	AE-60	AE-30	AE-60	AE SLIM-LINE
Minimum Valve Port Diameter	3/32"	1/16"	3/32"	1/8"	1/16"	1/8"	5/64"	5/16"
Connection Nomenclature	F250C		F312C100	F375C		F562C		SF562CX
Tubing O.D.	1/4"		5/16"	3/8"		9/16"		9/16"
Tubing I.D.	.083"		1/16"	1/8"		3/16"		5/16"

For Ordering Information See Pages 14-26. • For Installation & Maintenance See Pages 42-49.
For Dimensions See Pages 36-41. • For Spare Parts & Materials Specifications See Pages 30-35.

Diaphragm air operators for on-off service available for ALL AE Ermeto valves
All AE Ermeto Valves and Fittings are supplied with the necessary glands and sleeves

AIR-OPERATED VALVES

SERVICE UP TO 100,000 psi

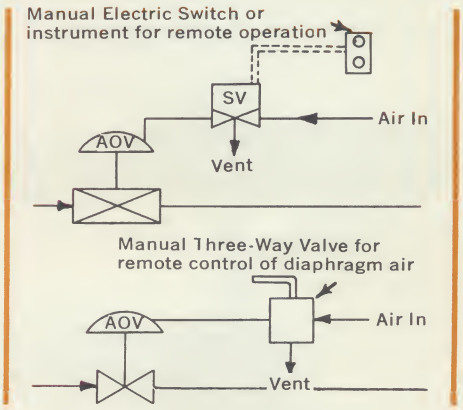
As illustrated on page 13, Autoclave Engineers offers four different size Air Operators in both Air-to-Close (ATC) and Air-to-Open (ATO) types for use with the standard valve bodies normally employed in the manual valves offered in this catalog. At least one size AE Air Operator is available, in each type, for use with every standard valve body marketed by Autoclave Engineers. For most standard valve bodies a choice of two or more AE Air Operators is available, in both types, to facilitate the most efficient and economical application of air operation to any combination of process requirements and available operating air pressure.

Selection data for Air Operators is given below.

FOR REMOTE ON-OFF OPERATION

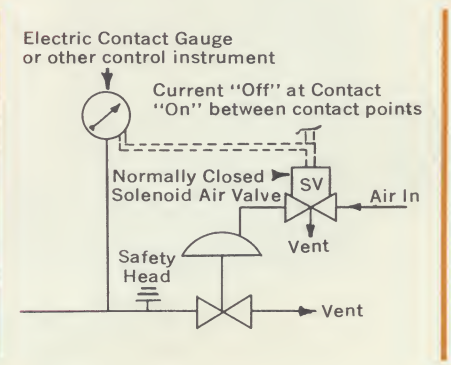
The air to operate, Air-to-Close or Air-to-Open valves can be controlled by a three-way manual low pressure valve or by a low pressure solenoid valve actuated either by a manual switch or an automatic control instrument. AE Air-Operated High Pressure Valves permit process control from a remotely located panel without the necessity of piping high pressure lines to the panel. *Thus safety is enhanced and process "hold-up" is reduced.*

Judicious selection of Air-to-Open or Air-to-Close valves, together with the air controlling devices, permits the design of systems to "fail-safe" in either the closed or open condition, as conditions may require, in the event of operating air or electrical failure or malfunction.



RELIEF VALVE SYSTEM

AE Air Operated Valves are frequently used in relief valve systems as illustrated in the schematic diagram to the right. Control by means of a contact gauge, or other control instrument, and a solenoid air valve provides an adjustable relief system that offers positive relief at any prescribed pressure and *positive reseating after the pressure has returned to normal.* Failure or malfunction of the electrical or air systems will cause the Air Operated Valve to open and relieve system pressure. A safety head assembly, with properly rated rupture disc, in series with the Air Operated Valve and ahead of it, will protect against malfunction of the solenoid valve. The electric contact gauge, or other controller, is set at whatever point pressure relief is desired. When pressure reaches this point, the electrical circuit to the solenoid air valve is interrupted causing this valve to close and vent air from the diaphragm operator of the Air Operated High Pressure Valve. This valve opens and relieves pressure. When pressure falls off, this sequence is reversed and the Air Operated High Pressure Valve reseats.



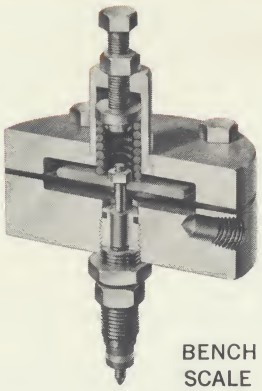
REQUIRED AIR PRESSURE TO OPERATE AE VALVES AT VARIOUS SYSTEM PRESSURES

1. Locate proposed system pressure
2. Locate proposed valve series
3. Compare air pressures for operators shown
4. Select smallest operator for which adequate air is available

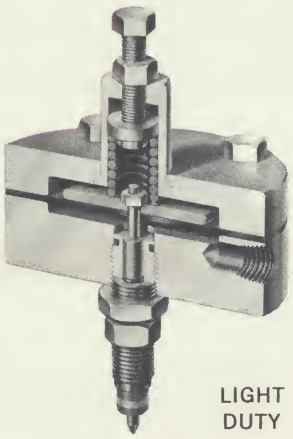
SYSTEM PRESSURE →		PRESSURE IN THOUSANDS OF PSI																			
VALVE SERIES ↓	OPERATOR ↓	1	2	3	4	5	6	7	8	9	10	15	20	25	30	40	50	60	70	80	90	100
SPEED VALVE 1/8"	Bench Scale	30	35	40	45	50	50	55	60	60	65	85										
SPEED VALVE 1/4" - 3/8"	Light Duty	25	30	35	45	50	55	60	70	75	80											
	Medium Duty					20	22	24	26	28	30											
SPACESAVER 1/8"	Light Duty	25	30	35	45	50	55	60	70	75	80											
	Medium Duty					20	22	24	26	28	30	40										
SPACESAVER 1/4" - 3/8"	Light Duty	25	35	50	60	75	85	100														
	Medium Duty					20	23	26	29	32	35											
SPACESAVER 1/2"	Medium Duty		15	20	25																	
SLIM-LINE 9/16"	Medium Duty			20	25	30	40	45	50	55	60	90										
	Heavy Duty								20		25	35										
AE30 1/4" - 3/8" - 9/16"	Light Duty	25	30	35	45	50	55	60	70	75	80											
	Medium Duty					20	22	24	26	28	30	35	40	47	55							
	Heavy Duty											15	18	22	25							
AE60 1/4" - 3/8" - 9/16"	Medium Duty														40	55	65	75				
	Heavy Duty														20	25	30	35				
AE100 5/16"	Medium Duty															55	65	75	85	100		
	Heavy Duty																	35	40	45	50	55

IMPORTANT NOTE: Average air pressure values good to approximately ±5 psi are shown in table. Tolerances, assembly and adjustment variations will cause variations in required air pressure. Careful adjustment will produce closer agreement.
Values apply to Air-to-Open valves if spring is properly adjusted for the intended service pressure. See Pages 48-49 for instructions.

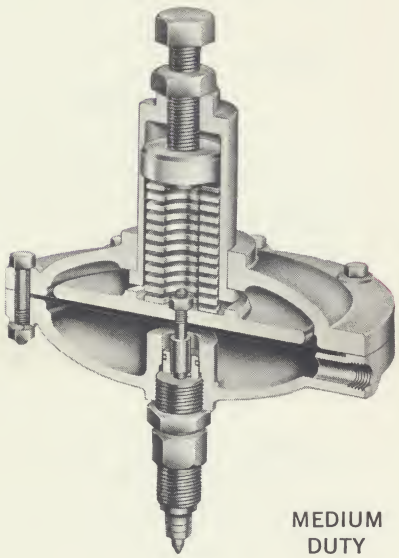
AIR-TO-OPEN TYPE



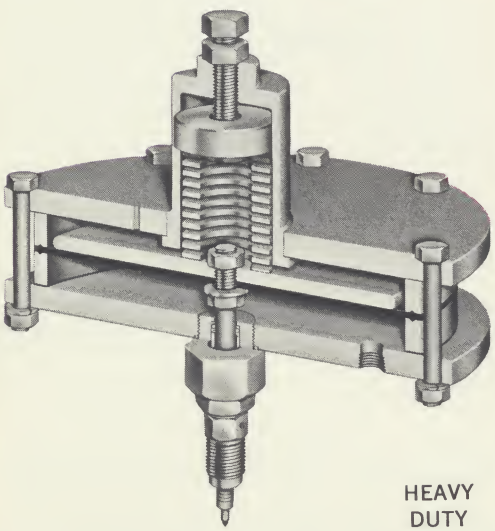
BENCH SCALE



LIGHT DUTY

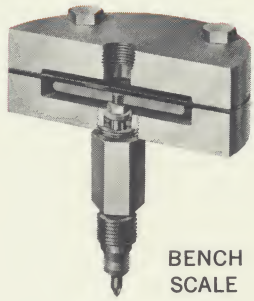


MEDIUM DUTY

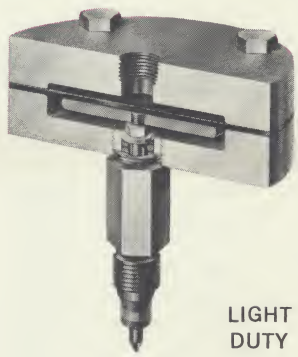


HEAVY DUTY

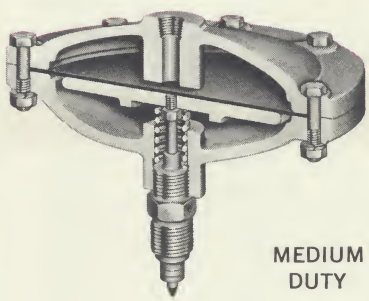
AIR-TO-CLOSE TYPE



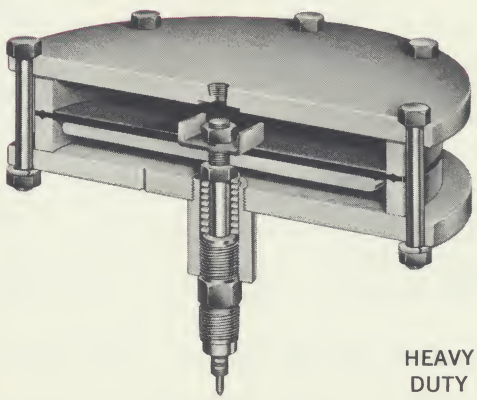
BENCH SCALE



LIGHT DUTY

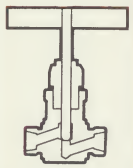


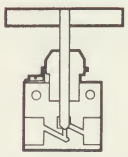
MEDIUM DUTY

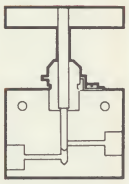


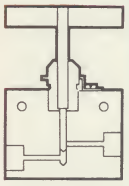
HEAVY DUTY

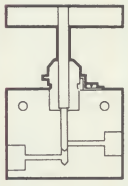
TWO-WAY STRAIGHT VALVES

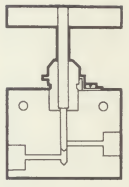

SPACESAVER


SPEED-VALVE


SLIM-LINE


AE-30 SERIES


AE-60 SERIES


AE-100 SERIES

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2001				
	SWM125	15,000	12V2001					
1/4" x .083"	F250C	30,000				30VM4071		
		60,000					60VM4071	
1/4" x 1/8"	W250	6,000		10V4071				
	SWM250	6,000	12V4071					
5/16" x 1/16"	F312C100	100,000						100V5071
3/8" x 1/8"	F375C	30,000				30VM6071		
		60,000					60VM6071	
3/8" x 1/4"	W375	6,000		10V6071				
	SWM375	6,000	12V6071					
1/2" x 3/8"	SWM500	4,000	12V8071					
9/16" x 3/16"	F562C	30,000				30VM9071		
		60,000					60VM9071	
9/16" x 5/16"	SF562CX	15,000			15SV9071			
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4081		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4081				
	SWM250	6,000	12V4081					
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6081		
		60,000						
3/8" x 1/4"	W375	6,000		10V6081				
	SWM375	6,000	12V6081					
1/2" x 3/8"	SWM500	4,000	12V8081					
9/16" x 3/16"	F562C	30,000				30VM9081		
		60,000						
9/16" x 5/16"	SF562CX	15,000			15SV9081			

METERING VALVES (two-way angle, replaceable seat type only)

Valve	Catalog Number
1/8" Metering Speed Valve	10V-2012
1/4" AE-30 Metering Valve	30VR-4872
1/4" AE-60 Metering Valve	60VRM-4872

HIGH TEMPERATURE STUFFING BOX

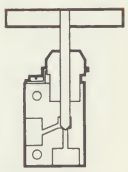
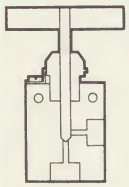
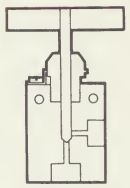
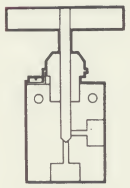
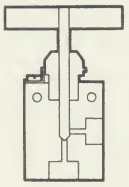
To order 1/4" or 3/8" Speed Valves or AE-30 Valves with High Temperature Stuffing Box, ADD LETTERS "HT" to desired valve Catalog Number. Example: 10V-4071HT; 30VM-4071HT.

*Pressure ratings based on 100° F.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

TWO-WAY ANGLE VALVES

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	Not Available SPACESAVER	 SPEED-VALVE	 SLIM-LINE	 AE-30 SERIES	 AE-60 SERIES	 AE-100 SERIES
			ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2002				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4072		
		60,000					60VM4072	
1/4" x 1/8"	W250	6,000		10V4072				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						100V5072
3/8" x 1/8"	F375C	30,000				30VM6072		
		60,000					60VM6072	
3/8" x 1/4"	W375	6,000		10V6072				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9072		
		60,000					60VM9072	
9/16" x 5/16"	SF562CX	15,000			15SV9072			
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4082		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4082				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6082		
		60,000						
3/8" x 1/4"	W375	6,000		10V6082				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9082		
		60,000						
9/16" x 5/16"	SF562CX	15,000			15SV9082			

AIR OPERATED VALVES

To order any of the valves listed above with air operators, select appropriate air operator from chart on page 12 and add the letters listed at right to the Catalog Number of the manual valve listed above.

NOTE: On valves with Air-to-Open operators, specify system operating pressure so spring can be properly adjusted prior to shipment.

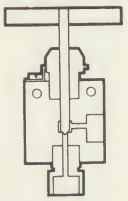
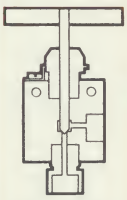
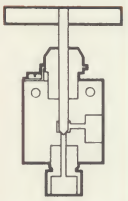
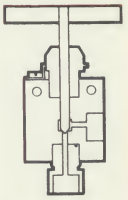
Ordering Letters	Type Air Operator	Ordering Letters	Type Air Operator
OB	Bench scale Air-to-Open	OM	Medium duty Air-to-Open
CB	Bench scale Air-to-Close	CM	Medium duty Air-to-Close
OL	Light duty Air-to-Open	OH	Heavy duty Air-to-Open
CL	Light duty Air-to-Close	CH	Heavy duty Air-to-Close

Example: 10V-40710L; 10V-4071CL.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

TWO-WAY ANGLE VALVES–REPLACEABLE SEAT

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	SPACESAVER	SPEED-VALVE	SLIM-LINE	AE-30 SERIES	AE-60 SERIES	AE-100 SERIES
			Not Available					Available On Special Order Only
			ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2802				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4872		
		60,000					60VM4872	
1/4" x 1/8"	W250	6,000		10V4872				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6872		
		60,000					60VM6872	
3/8" x 1/4"	W375	6,000		10V6872				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9872		
		60,000					60VM9872	
9/16" x 5/16"	SF562CX	15,000			15SV9872			
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4882		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4882				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6882		
		60,000						
3/8" x 1/4"	W375	6,000		10V6882				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9882		
		60,000						
9/16" x 5/16"	SF562CX	15,000			15SV9882			

METERING VALVES (two-way angle, replaceable seat type only)

Valve	Catalog Number
1/8" Metering Speed Valve	10V-2012
1/4" AE-30 Metering Valve	30VR-4872
1/4" AE-60 Metering Valve	60VRM-4872

HIGH TEMPERATURE STUFFING BOX

To order 1/4" or 3/8" Speed Valves or AE-30 Valves with High Temperature Stuffing Box, ADD LETTERS "HT" to desired valve Catalog Number. Example: 10V-4071HT; 30VM-4071HT.

*Pressure ratings based on 100° F.

• For Dimensions, See Pages 36-41 • For Installation and Maintenance, See Pages 42-49 • For Spare Parts, See Pages 30-35

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

THREE-WAY VALVES–TWO CONNECTIONS ON PRESSURE

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	Not Available SPACESAVER	SPEED-VALVE	SLIM-LINE	AE-30 SERIES	AE-60 SERIES	Available On Special Order Only AE-100 SERIES
			ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2003				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4073		
		60,000					60VM4073	
1/4" x 1/8"	W250	6,000		10V4073				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6073		
		60,000					60VM6073	
3/8" x 1/4"	W375	6,000		10V6073				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9073		
		60,000					60VM9073	
9/16" x 5/16"	SF562CX	15,000			15SV9073			
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4083		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4083				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6083		
		60,000						
3/8" x 1/4"	W375	6,000		10V6083				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9083		
		60,000						
9/16" x 5/16"	SF562CX	15,000			15SV9083			

AIR OPERATED VALVES

To order any of the valves listed above with air operators, select appropriate air operator from chart on page 12 and add the letters listed at right to the Catalog Number of the manual valve listed above.

NOTE: On valves with Air-to-Open operators, specify system operating pressure so spring can be properly adjusted prior to shipment.

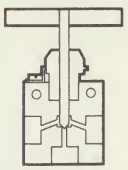
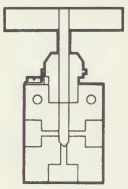
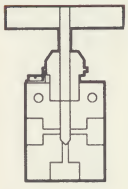
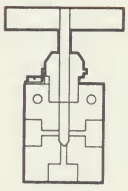
Ordering Letters	Type Air Operator	Ordering Letters	Type Air Operator
OB	Bench scale Air-to-Open	OM	Medium duty Air-to-Open
CB	Bench scale Air-to-Close	CM	Medium duty Air-to-Close
OL	Light duty Air-to-Open	OH	Heavy duty Air-to-Open
CL	Light duty Air-to-Close	CH	Heavy duty Air-to-Close

Example: 10V-40710L; 10V-4071CL.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

THREE-WAY VALVES–ONE CONNECTION ON PRESSURE

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	SPACESAVER	SPEED-VALVE	SLIM-LINE	AE-30 SERIES	AE-60 SERIES	AE-100 SERIES
			Not Available					Available On Special Order Only
			ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2004				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4074		
		60,000					60VM4074	
1/4" x 1/8"	W250	6,000		10V4074				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6074		
		60,000					60VM6074	
3/8" x 1/4"	W375	6,000		10V6074				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9074		
		60,000					60VM9074	
9/16" x 5/16"	SF562CX	15,000			15SV9074			
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4084		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4084				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000						
		60,000				30VM6084		
3/8" x 1/4"	W375	6,000		10V6084				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000						
		60,000				30VM9084		
9/16" x 5/16"	SF562CX	15,000			15SV9084			

**METERING VALVES (two-way angle, replaceable seat type only)

Valve	Catalog Number
1/8" Metering Speed Valve	10V-2012
1/4" AE-30 Metering Valve	30VR-4872
1/4" AE-60 Metering Valve	60VRM-4872

HIGH TEMPERATURE STUFFING BOX

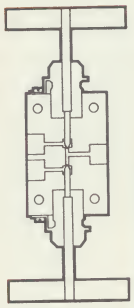
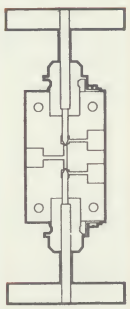
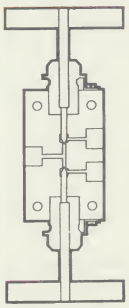
To order 1/4" or 3/8" Speed Valves or AE-30 Valves with High Temperature Stuffing Box, ADD LETTERS "HT" to desired valve Catalog Number. Example: 10V-4071HT; 30VM-4071HT.

*Pressure ratings based on 100° F.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

THREE-WAY–TWO-STEM MANIFOLD VALVES

STANDARD TUBING SIZES (O.D. x I.D.)	CONNECTION NOMENCLATURE	PRESSURE RATING* PSI	SPACESAVER	SPEED-VALVE	SLIM-LINE	AE-30 SERIES	AE-60 SERIES	AE-100 SERIES
			Not Available		Available On Special Order Only			Available On Special Order Only
			ERMETO CONNECTIONS		AE-CONE CONNECTIONS			
TWO PIECE NEEDLE STEMS								
1/8" x 1/16"	W125	15,000		10V2005				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4075		
		60,000					60VM4075	
1/4" x 1/8"	W250	6,000		10V4075				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6075		
		60,000					60VM6075	
3/8" x 1/4"	W375	6,000		10V6075				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9075		
		60,000					60VM9075	
9/16" x 5/16"	SF562CX	15,000						
TWO PIECE TAPERED STEMS								
1/8" x 1/16"	W125	15,000		**				
	SWM125	15,000						
1/4" x .083"	F250C	30,000				30VM4085		
		60,000					**	
1/4" x 1/8"	W250	6,000		10V4085				
	SWM250	6,000						
5/16" x 1/16"	F312C100	100,000						
3/8" x 1/8"	F375C	30,000				30VM6085		
		60,000						
3/8" x 1/4"	W375	6,000		10V6085				
	SWM375	6,000						
1/2" x 3/8"	SWM500	4,000						
9/16" x 3/16"	F562C	30,000				30VM9085		
		60,000						
9/16" x 5/16"	SF562CX	15,000						

AIR OPERATED VALVES

To order any of the valves listed above with air operators, select appropriate air operator from chart on page 12 and add the letters listed at right to the Catalog Number of the manual valve listed above.

NOTE: On valves with Air-to-Open operators, specify system operating pressure so spring can be properly adjusted prior to shipment.

Ordering Letters	Type Air Operator	Ordering Letters	Type Air Operator
OB	Bench scale Air-to-Open	OM	Medium duty Air-to-Open
CB	Bench scale Air-to-Close	CM	Medium duty Air-to-Close
OL	Light duty Air-to-Open	OH	Heavy duty Air-to-Open
CL	Light duty Air-to-Close	CH	Heavy duty Air-to-Close

Example: 10V-40710L; 10V-4071CL.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE VALVES ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

FITTINGS WITH ERMETO AND AE-CONE CONNECTIONS

FITTINGS

On pages 20 to 28, Autoclave Engineers offers two complete lines of fittings; one for use in AE Ermeto systems and one line for use in AE-Cone systems. Ermeto fittings are manufactured from annealed 316 ss.; Cone fittings from cold-worked 316 ss.

Pressure Ratings: Fittings & Accessories

Except as otherwise indicated, all connections on any given fitting will be of the same type and for the same size tubing. All fittings have been designed for the pressure ratings appropriate to the standard tubing with which they will be used. See tables on page 6.

ADAPTERS

The most complete line of standard adapters ever offered is shown on pages 22-24.

Pressure Ratings: Adapters

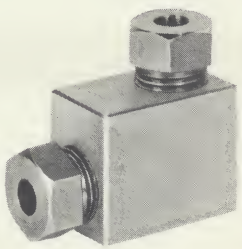
Each individual adapter is rated in accordance with the combination of connections employed and, more specifically, in accordance with the lower rated connection used. The pressure rating is indicated by the *prefix number or numbers* used in the Catalog Number. See pages 22 and 24 for more specific information and examples.

GAUGE CONNECTORS

A complete line of gauge connectors, many of which are standard adapters repeated for convenience, is shown on page 28.

Pressure Ratings: Gauge Connectors

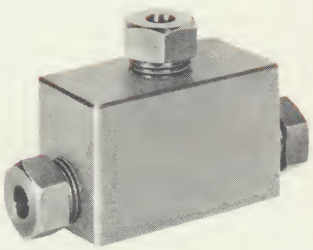
Gauge connectors having *prefix numbers* in their Catalog Numbers are rated in accordance with those *prefix numbers* as indicated above for "adapters." Gauge connectors whose Catalog Numbers have *no prefix numbers* are rated as indicated above for "fittings."



ELBOWS

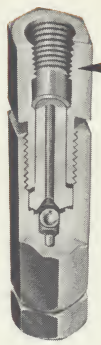
ERMETO CAT. NO.	AE– CONE CAT. NO.	STANDARD TUBING SIZE (inches)	CONNECTION NOMEN-CLATURE	ERMETO CAT. NO.	AE– CONE CAT. NO.
SL2200		1/8 x 1/16	W125	SKO2200	
	CL4400	1/4 x .083	F250C		CKO4400
SL4400		1/4 x 1/8	SW250	SKO4400	
	CL5500	5/16 x 1/16	F312C100		
	CL6600	3/8 x 1/8	F375C		CKO6600
SL6600		3/8 x 1/4	SW375	SKO6600	
SL8800		1/2 x 3/8	SW500	SKO8800	
	CL9900	9/16 x 3/16	F562C		CKO9900
	CLX9900	9/16 x 5/16	SF562CX		CKOX9900

"O"-RING CHECK VALVE



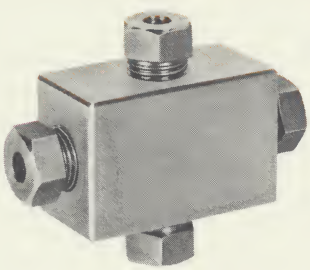
TEES

ST2220		1/8 x 1/16	W125	SGK2402	
	CT4440	1/4 x .083	F250C		
ST4440		1/4 x 1/8	SW250	SGK4402	
	CT5550	5/16 x 1/16	F312C100		
	CT6660	3/8 x 1/8	F375C		
ST6660		3/8 x 1/4	SW375	SGK6402	
ST8880		1/2 x 3/8	SW500		
	CT9990	9/16 x 3/16	F562C		
	CTX9990	9/16 x 5/16	SF562CX		



1/4" NPT

GAUGE SURGE CHECK VALVE



CROSSES

SX2222		1/8 x 1/16	W125	SK2202	
	CX4444	1/4 x .083	F250C		CK4402
SX4444		1/4 x 1/8	SW250	SK4402	
	CX5555	5/16 x 1/16	F312C100		
	CX6666	3/8 x 1/8	F375C		CK6602
SX6666		3/8 x 1/4	SW375	SK6602	
SX8888		1/2 x 3/8	SW500	SK8802	
	CX9999	9/16 x 3/16	F562C		CK9902
	CXX9999	9/16 x 5/16	SF562CX		CKX9902

GAUGE OR LINE SURGE CHECK VALVE

IMPORTANT NOTE! "Gauge Surge Check Valves" and "Gauge or Line Surge Check Valves" must be used in the vertical position. Under normal conditions flow is unrestricted in the direction of flow shown on the valve. A sudden flow increase from line or gauge failure will cause the ball to check until the condition can be corrected. A manual valve installed in a by-pass around the check valve will facilitate unseating the ball after the break is corrected.

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE FITTINGS ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

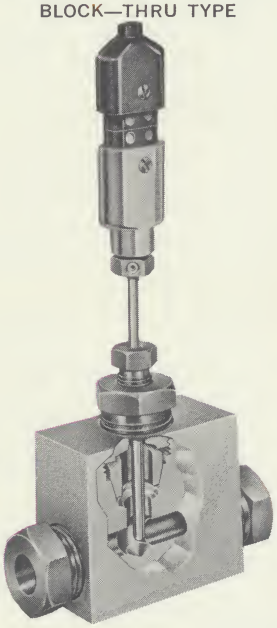
FITTINGS WITH ERMETO AND AE-CONE CONNECTIONS

BALL CHECK —THRU TYPE

ERMETO CAT. NO.	AE-CONE CAT. NO.	STANDARD TUBING SIZE (inches)	CONNECTION NOMEN-CLATURE	ERMETO CAT. NO.	AE-CONE CAT. NO.
SB2201		1/8 x 1/16	W125	SLF2200	
	CB4401	1/4 x .083	F250C		CLF4400
SB4401		1/4 x 1/8	SW250	SLF4400	
		5/16 x 1/16	F312C100		
	CB6601	3/8 x 1/8	F375C		CLF6600
SB6601		3/8 x 1/4	SW375	SLF6600	
SB8801		1/2 x 3/8	SW500	SLF8800	
	CB9901	9/16 x 3/16	F562C		CLF9900
	CBX9901	9/16 x 5/16	SF562CX		CLFX9900

LINE FILTERS

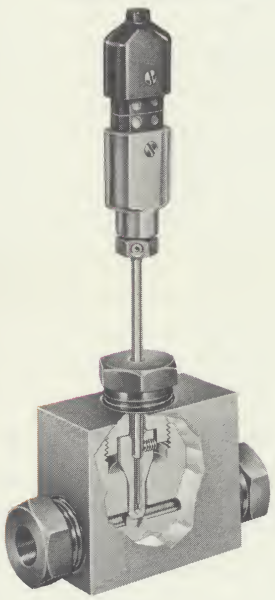
PENCIL THERMOCOUPLE BLOCK—THRU TYPE



STC2200		1/8 x 1/16	W125		
		1/4 x .083	F250C		CTC4400
STC4400		1/4 x 1/8	SW250		
		5/16 x 1/16	F312C100		
		3/8 x 1/8	F375C		CTC6600
STC6600		3/8 x 1/4	SW375		
STC8800		1/2 x 3/8	SW500		
		9/16 x 3/16	F562C		CTC9900
	CTCX9900	9/16 x 5/16	SF562CX		
STC2201		1/8 x 1/16	W125		
		1/4 x .083	F250C		CTC4401
STC4401		1/4 x 1/8	SW250		
		5/16 x 1/16	F312C100		
		3/8 x 1/8	F375C		CTC6601
STC6601		3/8 x 1/4	SW375		
STC8801		1/2 x 3/8	SW500		
		9/16 x 3/16	F562C		CTC9901
	CTCX9901	9/16 x 5/16	SF562CX		

PENCIL THERMOCOUPLE BLOCK—ANGLE TYPE

PENCIL THERMOCOUPLE BLOCK—THRU TYPE



PENCIL THERMOCOUPLE BLOCK—ANGLE TYPE

• *For Dimensions, See Pages 36-41* • *For Installation and Maintenance, See Pages 42-49* • *For Spare Parts, See Pages 30-35*

ALL AE FITTINGS ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

MALE-FEMALE ADAPTERS

Listed here are adapters for virtually every conceivable transition in connection type and tubing size. Some of these transitions, specifically those in which the smaller connection is on the male end, are not recommended because of the hazard of twisting off the male section during make-up. *Generally, it is recommended that male-female adapters have the larger size connection on the male end.* All of the Adapters manufactured for stock reflect this recommended practice. Adapters reflecting the reverse situation are listed for those rare circumstances where the recommended practice cannot be followed, and will be made up on special order only.

The terms "flat bottom gasket connection" and "flat top gasket connection" refer to connections which, in general, are used only on Autoclave Engineers' pressure vessels and other major equipment. The assembly drawings pertaining to this major equipment will identify these connections, when they are used, by the nomenclature shown in the chart. (Also, see page 6)

PRESSURE RATINGS

The pressure rating is based on the combination of connections employed in the adapter and, specifically, on the lower rated connection used. It is indicated by the prefix number or numbers which appear in the Autoclave Engineers' Catalog Number. Thus, a #6M42C1 adapter is rated for 6,000 psi. and a #4M68D2 adapter is rated for 4,000 psi. service.

The letter which appears in the next to the last position in the Autoclave Engineers' Catalog Number identifies the type configuration employed, as illustrated on page 23. Thus, a #6M66B2 adapter is a Type B configuration, as shown.

TO USE THE CHART:

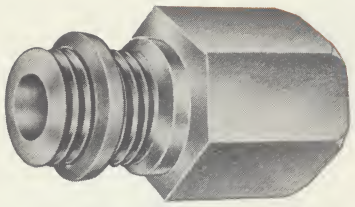
1. Locate the female connection *to be adapted* in the vertical column.
2. Locate the connection desired in the female end of the adapter across the top of the chart.
3. The catalog number of the required adapter is located at the intersection of the horizontal and vertical columns identified in steps #1 and #2.

CATALOG NUMBERS SHOWN IN COLOR ARE NORMALLY STOCKED — OTHERS ARE SPECIAL ORDER ONLY

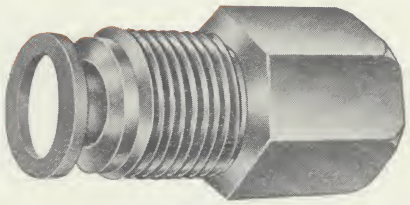
YOU WANT THIS FEMALE CONNECTION ON THE OTHER END → / YOU WANT A MALE END ADAPTER TO GO INTO THIS FEMALE CONNECTION ↓		1/8" Ermeto W125	1/4" Slim-Line Ermeto SW250	3/8" Slim-Line Ermeto SW375	1/2" Slim-Line Ermeto SW500	1/4" Slim-Line Cone SF250C	3/8" Slim-Line Cone SF375C	9/16" Slim-Line Cone SF562CX	1/4" AE Cone F250C
		CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER
1/8" Ermeto	W125		6M24C2	6M26C2	4M28C2			6M29C6	6M24C3
1/4" Ermeto	W250	6M42C1			4M48C2			6M49C6	6M44C3
3/8" Ermeto	W375	6M62C1			4M68C2			6M69C6	6M64C3
1/4" Slim-Line Ermeto	SW250	6M42D1		6M46D2	4M48D2			6M49D6	6M44D3
3/8" Slim-Line Ermeto	SW375	6M62D1	6M64D2		4M68D2			6M69D6	6M64D3
1/2" Slim-Line Ermeto	SW500	4M82D1	4M84D2	4M86D2				4M89D6	4M84D3
1/4" AE Cone	F250C	15M42B1	6M44B2	6M46B2	4M48B2			15M49B6	
5/16" AE Cone	F312C100								60M54B3
3/8" AE Cone	F375C	15M62B1	6M64B2	6M66B2	4M68B2			15M69B6	60M64B3
9/16" AE Cone	F562C	15M92B1	6M94B2	6M96B2	4M98B2			15M99B6	60M94B3
9/16" AE Cone	F562CX	15MX92B1	6MX94B2	6MX96B2	4MX98B2				15MX94B3
1/4" Slim-Line Cone	SF250C	15M42K1	6M44K2	6M46K2	4M48K2			15M49K6	
3/8" Slim-Line Cone	SF375C	15M62K1	6M64K2	6M66K2	4M68K2			15M69K6	15M64K3
9/16" Slim-Line Cone	SF562CX	15MX92K1	6MX94K2	6MX96K2	4MX98K2				15MX94K3
7/16" Flat Bottom Gasket	F437FB	15M72E1	6M74E2	6M76E2		15M74E5	15M76E5		
9/16" Flat Bottom Gasket	F562FB	15M92E1	6M94E2	6M96E2	4M98E2			15M99E6	15M94E3
9/16" Flat Top Gasket	F562FT	15M92R1	6M94R2	6M96R2	4M98R2			15M99R6	15M94R3
3/4" Flat Bottom Gasket	F750FB	15M122E1	6M124E2	6M126E2	4M128E2			15M129E6	15M124E3
1/8" NPT		6M22N1	6M24N2	6M26N2	4M28N2			6M29N6	6M24N3
1/4" NPT		6M42N1	6M44N2	6M46N2	4M48N2			6M49N6	6M44N3
3/8" NPT		6M62N1	6M64N2	6M66N2	4M68N2			6M69N6	6M64N3
1/2" NPT		6M82N1	6M84N2	6M86N2	6M88N2			6M89N6	6M84N3

ALL M-F ADAPTERS ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

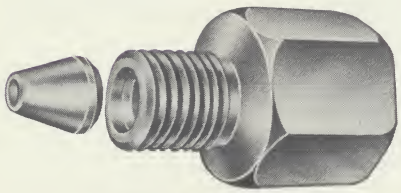
MALE-FEMALE ADAPTERS



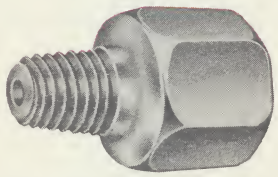
FLAT TOP GASKET
TYPE R



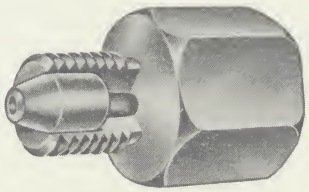
FLAT BOTTOM GASKET
TYPE E



DOUBLE CONE PLUG
TYPES C AND D



MALE TAPERED PIPE THREAD
TYPE N

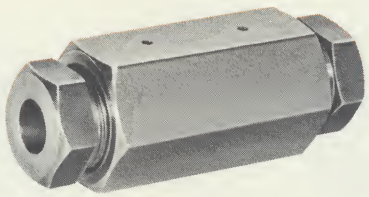


DOUBLE CONE PLUG
TYPES B AND K

5/16" AE Cone F312C100	3/8" AE Cone F375C	9/16" AE Cone F562C	1/8" NPT	1/4" NPT	3/8" NPT	1/2" NPT	← YOU WANT THIS FEMALE CONNECTION ON THE OTHER END	
CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	↓ YOU WANT A MALE END ADAPTER TO GO INTO THIS FEMALE CONNECTION	
	6M26C3	6M29C3	6M22C8	6M24C8	6M26C8	6M28C8	W125	1/8" Ermeto
	6M46C3	6M49C3	6M42C8	6M44C8	6M46C8	6M48C8	W250	1/4" Ermeto
	6M66C3	6M69C3	6M62C8	6M64C8	6M66C8	6M68C8	W375	3/8" Ermeto
	6M46D3	6M49D3	6M42D8	6M44D8	6M46D8	6M48D8	SW250	1/4" Slim-Line Ermeto
	6M66D3	6M69D3	6M62D8	6M64D8	6M66D8	6M68D8	SW375	3/8" Slim-Line Ermeto
	4M86D3	4M89D3	6M82D8	6M84D8	6M86D8	6M88D8	SW500	1/2" Slim-Line Ermeto
60M45B3	60M46B3	60M49B3	6M42B8	6M44B8	6M46B8	6M48B8	F250C	1/4" AE Cone
	60M56B3	60M59B3					F312C100	5/16" AE Cone
60M65B3		60M69B3	6M62B8	6M64B8	6M66B8	6M68B8	F375C	3/8" AE Cone
60M95B3	60M96B3		6M92B8	6M94B8	6M96B8	6M98B8	F562C	9/16" AE Cone
	15MX9653	15MX99B3	6MX92B8	6MX94B8	6MX96B8	6MX98B8	F562CX	9/16" AE Cone
	15M46K3	15M49K3	6M42K8	6M44K8	6M46K8	6M48K8	SF250C	1/4" Slim-Line Cone
	15M66K3	15M69K3	6M62K8	6M64K8	6M66K8	6M68K8	SF375C	3/8" Slim-Line Cone
	15MX96K3	15MX99K3	6MX92K8	6MX94K8	6MX96K8	6MX98K8	SF562CX	9/16" Slim-Line Cone
			6M72E8	6M74E8	6M76E8	6M78E8	F437FB	7/16" Flat Bottom Gasket
	15M96E3		6M92E8	6M94E8	6M96E8	6M98E8	F562FB	9/16" Flat Bottom Gasket
	15M96R3		6M92R8	6M94R8	6M96R8	6M98R8	F562FT	9/16" Flat Top Gasket
	15M126E3	15M129E3	6M122E8	6M124E8	6M126E8	6M128E8	F750FB	3/4" Flat Bottom Gasket
	6M26N3	6M29N3						1/8" NPT
	6M46N3	6M49N3						1/4" NPT
	6M66N3	6M69N3						3/8" NPT
	6M86N3	6M89N3						1/2" NPT

ALL M-F ADAPTERS ARE SUPPLIED COMPLETE WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

COUPLINGS • REDUCING COUPLINGS • ADAPTER COUPLINGS



The couplings shown here permit the joining of any combination of standard size tubing or tubing and standard pipe.

PRESSURE RATING

The pressure rating of AE couplings is based on the combination of connections employed and, specifically, on the lower rated connection used. It is indicated by the prefix number or numbers which appear in the Catalog Number. Thus a #4F2812 adapter coupling is rated for 4,000 psi. and a #6F4622 reducing coupling is rated for 6,000 psi. Numbers shown in the chart in colored type represent frequently used couplings which are stocked. Others can be made up on special order although it may be more economical and quicker to use two couplings in series with common intermediate connections or one coupling in combination with a male-female adapter from Pages 22-23.

TO USE CHART:

1. Locate the female connection required on one end in the vertical column.
2. Locate the female connection required on the other end across the top of the chart.
3. The catalog number of the required coupling is located at the intersection of the horizontal and vertical columns, identified in steps #1 and #2.

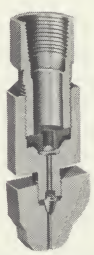
ALL AE COUPLINGS ARE SUPPLIED WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

YOU WANT THIS FEMALE CONNECTION ON ONE END →		1/8" Ermeto W125	1/4" Slim-Line Ermeto SW250	3/8" Slim-Line Ermeto SW375	1/2" Slim-Line Ermeto SW500	1/4" AE-Cone F250C	5/16" AE-Cone F312C100	3/8" AE-Cone F375C	9/16" AE-Cone F562C	9/16" Slim-Line AE-Cone SF562CX
YOU WANT THIS FEMALE CONNECTION ON THE OTHER END ↓		CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.	CAT. NO.
1/8" Ermeto	W125	15F2211	6F2412	6F2612	4F2812	15F2413		15F2613	15F2913	15F2916
1/4" Slim-Line Ermeto	SW250		6F4422	6F4622	4F4822	6F4423		6F4623	6F4923	6F4926
3/8" Slim-Line Ermeto	SW375			6F6622	4F6822	6F6423		6F6623	6F6923	6F6926
1/2" Slim-Line Ermeto	SW500				4F8822	4F8423		4F8623	4F8923	4F8926
1/4" AE Cone	F250C					60F4433	60F4533	60F4633	60F4933	15F4936
5/16" AE Cone	F312C100						100F5533	60F5633	60F5933	
3/8" AE Cone	F375C							60F6633	60F6933	15F6936
9/16" AE Cone	F562C								60F9933	15F9936
9/16" Slim-Line Cone	SF562CX									15F9966
1/8" NPT		6F2281	6F2482	6F2682	6F2882	6F2483		6F2683	6F2983	6F2986
1/4" NPT		5F4281	6F4482	6F4682	6F4882	6F4483		6F4683	6F4983	6F4986
3/8" NPT		6F6281	6F6482	6F6682	6F6882	6F6483		6F6683	6F6983	6F6986
1/2" NPT		6F8281	6F8482	6F8682	6F8882	6F8483		6F8683	6F8983	6F8986

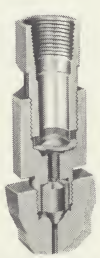
UNIVERSAL SAFETY HEADS

Autoclave Engineers has developed a new Universal Type Safety Head Assembly. There is one of these for each size tubing connection used in AE fittings and each can be installed in any standard coupling, elbow, cross or tee. In response to the frequent requirement for low bursting pressure rupture discs and the conflicting preferences for flat or angle seat discs, these assemblies have been designed to permit the use of a number of different size and type discs in the same safety head. In order to assure a port dimension in the head at least equivalent to the I.D. of the system tubing, five of the eight assemblies offered have a 3/16" diameter bore up to the disc. These can be used with any of the discs shown on the opposite page. Three of the assemblies offered have a 3/8" diameter bore up to the disc. All of the discs on the opposite page except the 3/16" can be used in the 3/8" port assemblies. The illustrations show various combinations of disc and hold-down ring size and connection type. Part numbers on seal plugs and hold-down rings are shown in the Spare Parts Sections, *pages 30-35*

TO ORDER the AE Universal Safety Head Assembly: the size disc to be used must be specified so proper hold-down ring can be furnished. Various rings can be interchanged as required. Discs are not furnished with the assembly.

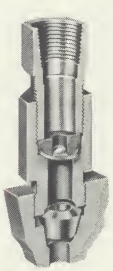


ERMETO CONNECTION 3/16" Port

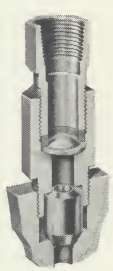


AE-CONE CONNECTION 3/16" Port

ERMETO CAT. NO.	AE-CONE CAT. NO.	STANDARD TUBING SIZE (inches)	CONNECTION NOMENCLATURE	ERMETO CAT. NO.	AE-CONE CAT. NO.
SS2600		1/8 x 1/16	W125		
	CS4600	1/4 x .083	F250C		
SS4600		1/4 x 1/8	SW250		
		5/16 x 1/16	F312C100		
	CS6600	3/8 x 1/8	F375C		
		3/8 x 1/4	SW375	SS6600	
		1/2 x 3/8	SW500	SS8600	
	CS9600	9/16 x 3/16	F562C		
		9/16 x 5/16	SF562CX		CSX9600



ERMETO CONNECTION 3/8" Port



AE-CONE CONNECTION 3/8" Port

PREBULGED RUPTURE DISCS

Rupture discs should be selected according to reaction conditions rather than Autoclave ratings, provided such ratings are not exceeded. For maximum disc life, working pressure should not exceed 65% of the rupture rating. Working pressures as high as 90% of rupture rating have been used. With higher pressure to rupture ratios and pressure or temperature cycling, progressively more frequent disc replacements will be necessary. At the upper extreme, replacement after each cycle may be required. Corrosion and metal fatigue affect the rupture pressure of a disc. Premature disc rupture can be avoided by frequent disc replacement.

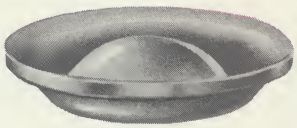
Venting capacity of a safety head may be exceeded if a "run-away" exothermic reaction should occur. Additional safety provisions should be made for reactions that are difficult to control.

Manufacturer's Tolerances: +6% to −3% of nominal rating. Discs rupture within ±5% of delivered rating. All discs are rated at 72° F. with pressure correction for temperature variation. Discs can be coated, one or two sides, with Teflon, Kel-F, vinylite, bakelite and lead, or lined, one side with nonporous Kel-F sheet. Coatings and linings increase minimum rupture ratings available.

Two types of discs are available for use in the Universal Safety Head Assemblies shown on page 24 and in the nonuniversal safety heads. The 3/16" F, 7/16" F and 1/2" F discs have a flat seat and the 1/4" A has a 30° angular seat. Illustrations of these two types are shown below.

TO ORDER RUPTURE DISCS SPECIFY:

1. Quantity
2. Material
3. Disc Size
4. Desired rupture rating.
5. Anticipated Disc Temperature.
6. Type of coating or lining (if required).



UNCOATED INCONEL DISCS STOCKED BY AUTOCLAVE ENGINEERS

NOMINAL RATING	3/16" F	1/4" A	7/16" F	1/2" F	NOMINAL RATING	3/16" F	1/4" A	7/16" F	1/2" F	NOMINAL RATING	3/16" F	1/4" A	7/16" F	1/2" F
700				X	4,500		X		X	20,000		X	X	
900				X	5,000		X		X	22,500	X	X		
1,250				X	6,000				X	25,000	X	X		
1,500		X		X	7,000				X	27,500		X		
1,750				X	7,500		X			30,000		X		
2,000		X		X	8,000				X	32,500		X		
2,250				X	9,000				X	35,000		X		
2,500		X		X	10,000		X		X	37,500		X		
3,000		X		X	12,500		X	X		40,000		X		
3,500		X		X	15,000		X	X		42,500		X		
4,000		X		X	17,500		X	X		45,000		X		

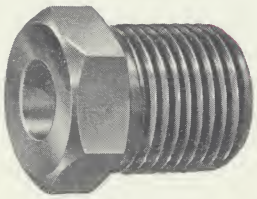
DISCS AVAILABLE ON SPECIAL ORDER

MATERIAL	Max. Temp. °F.	FLAT SEAT									30° ANGULAR SEAT		
		3/16"			7/16"			1/2"			1/4"		
		Minimum Rating		Max.* Rating Uncoated	Minimum Rating		Max.* Rating Uncoated	Minimum Rating		Max.* Rating Uncoated	Minimum Rating		Max.* Rating Uncoated
		Uncoated	Teflon Coating		Uncoated	Teflon Coating		Uncoated	Teflon Coating		Uncoated	Teflon Coating	
Inconel	900	1,900	2,120	26,500	820	935	20,000	700	800	10,000	1,200	1,400	45,000
Monel	800	1,650	1,870	24,000	720	835	18,000	630	730	9,000	640	1,000	40,000
Nickel	750	1,260	1,480	20,000	550	665	15,000	475	575	7,500	860	1,000	35,000
18-8 S.S.	600	2,350	2,570	26,500	1,045	1,160	20,000	890	990	10,000	1,500	1,640	50,000
Platinum	600	735	955	**	315	430	**	275	375	**	500	600	**
Aluminum	250	310	940	1,750	130	400	1,300	110	350	650	200	470	2,000
Copper	250	930	1,320	7,500	375	570	5,600	305	500	2,800	640	790	10,000
Silver	250	525	1,200	4,500	225	515	3,000	200	450	1,700	460	790	6,000

**Pressures greater than the maxima shown above are available on special request.*

***Higher pressure discs in this material are normally accomplished by veneering a base metal disc with .0025" platinum.*

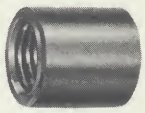
GLANDS, COLLARS, SLEEVES AND PLUGS



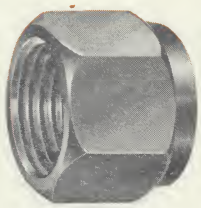
MALE GLANDS
Standard material is 416 ss. Specify 316 ss. for use inside pressure vessels and/or at temperatures above 650° F.

Ermeto Cat. No.	AE-Cone Cat. No.	Connection Nomenclature	Standard Tubing Size (inches)	Connection Nomenclature	Ermeto Cat. No.	AE-Cone Cat. No.
SMN20		W125	1/8 x 1/16	SWM125 W125	SSL20	
	CGL40	F250C	1/4 x .083	F250C		CCL40
SMN40		SW250	1/4 x 1/8	SWM250 SW250	SSL40	
	CGL50	F312C100	5/16 x 1/16	F312C100		CCL50
	CGL60	F375C	3/8 x 1/8	F375C		CCL60
SMN60		SW375	3/8 x 1/4	SWM375 SW375	SSL60	
SMN80		SW500	1/2 x 3/8	SWM500 SW500	SSL80	
	CGL90	F562C	9/16 x 3/16	F562C		CCL90
	CGLX90	SF562CX	9/16 x 5/16	SF562CX		CCLX90

SLEEVES FOR ERMETO CONNECTIONS
Standard material is 316 ss.; 17-4PH available if specified.

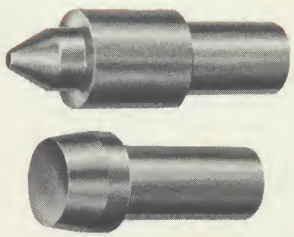


COLLARS FOR AE-CONE CONNECTIONS
Standard material is 416 ss.; 316 ss. available if specified.



FEMALE GLANDS
Standard material is 416 ss. Specify 316 ss. for use inside pressure vessels and/or at temperatures above 650° F.

SFN20		SWM125	1/8 x 1/16	SWM125 W125	SP20	
		F250C	1/4 x .083	F250C		CP40
SFN40		SWM250	1/4 x 1/8	SWM250 SW250	SP40	
		F312C100	5/16 x 1/16	F312C100		CP50
		F375C	3/8 x 1/8	F375C		CP60
SFN60		SWM375	3/8 x 1/4	SWM375 SW375	SP60	
SFN80		SWM500	1/2 x 3/8	SWM500 SW500	SP80	
		F562C	9/16 x 3/16	F562C		CP90
		SF562CX	9/16 x 5/16	SF562CX		CPX90



PLUGS
Standard material is 316 ss.; other materials available on special order.

AE-CONE NIPPLES

Superpressure quality Type 304 SS. Nipples* coned and threaded both ends. Any length on special order.

STOCK LENGTHS → INCHES	2¾	3	4	6	8	10	12
	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER
NIPPLES 1/4" O.D. x .083" I.D. Type 304 S.S.	CN4402			CN4406	CN4408	CN44010	CN44012
NIPPLES 5/16" O.D. x 1/16" I.D. Type 304 S.S.		CN5503		CN5506	CN5508	CN55010	CN55012
NIPPLES 3/8" O.D. x 1/8" I.D. Type 304 S.S.		CN6603		CN6606	CN6608	CN66010	CN66012
NIPPLES 9/16" O.D. x 3/16" I.D. Type 304 S.S.			CN9904	CN9906	CN9908	CN99010	CN99012
NIPPLES 9/16" O.D. x 5/16" I.D. Type 304 S.S.			CNX9904	CNX9906	CNX9908	CNX99010	CNX99012

Since no special tubing-end preparation is necessary, Ermeto nipples are not stocked. Simply cut the proper length of tubing and install. Shorter than full lengths of Ermeto tubing can be purchased.

For Installation and Maintenance — See Pages 42-49

Superpressure Quality Tubing

ANNEALED TUBING FOR ERMETO CONNECTIONS

SUPERPRESSURE QUALITY TUBING

AE superpressure quality tubing is made to Autoclave Engineers' rigid specifications, expressly for high pressure work, for use in AE-Cone systems. Manufactured from specially selected redraw billet stock, this tubing has the same high quality characteristics as Bourdon gauge tubing. Billets are bored and ground internally—after piercing—prior to cold drawing. Rate of reduction and intermediate annealing is carefully controlled to greatly reduce the number and depth of craters and fissures in the finished product and to provide desirable grain structure.

Every lot of AE superpressure quality tubing is carefully inspected for possible flaws. Skilled tubing inspectors check the tubing internally and externally. Microphotographs are taken from each end of specimens in every lot. Should the quality of any specimen be questioned, every length of tubing in lot is inspected. As an additional quality control measure, each tubing length is hydrostatically tested at working pressure.

Tubing O.D. and I.D. dimensions are held to a tolerance which insures easy threading. Wall thickness and hardness are controlled to assure safe, trouble-free performance. Tubing finish is also checked for possible scratches, dents and out-of-round condition.

Tubing is furnished in random lengths 15 to 22 feet long. Shorter lengths may be purchased, if required.

TO ORDER AE Superpressure quality tubing specify O.D., I.D. and material.

	O.D. INCHES	I.D. INCHES	PRESSURE RATING (AT 100° F.)	MATERIAL AVAILABLE FROM STOCK		
				304 S.S.	316 S.S.	347 S.S.
	¼"	.083"	60,000 p.s.i.	X	X	X
	5/16"	1/16"	100,000 p.s.i.		X	
	3/8"	1/8"	60,000 p.s.i.	X	X	X
	9/16"	3/16"	60,000 p.s.i.	X	X	X
	9/16"	5/16"	15,000 p.s.i.	X	X	

ANNEALED TUBING

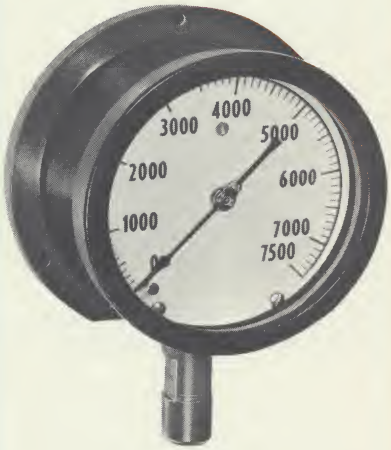
AE annealed tubing for Ermeto connections is seamless, cold drawn stainless tubing of a quality suitable for high pressure applications. In addition to the manufacturer's usual high quality control standards, a further rigidly enforced specification provides for annealing to a range of 125-150 Brinell hardness after the completion of cold drawing to size. *This specification assures proper make-up of Ermeto connections* together with appropriate strength for high pressure use.

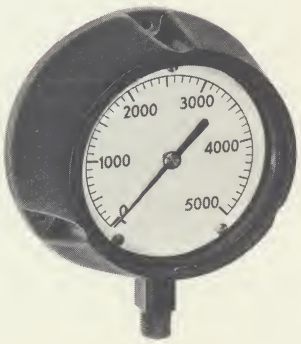
Tubing is furnished in random lengths 15 to 22 feet long. Shorter lengths may be purchased, if required.

TO ORDER AE Annealed Tubing Specify O.D., I.D., and Material.

	O.D. INCHES	I.D. INCHES	PRESSURE RATING (AT 100° F.)	MATERIAL AVAILABLE FROM STOCK		
				304 S.S.	316 S.S.	347 S.S.
	1/8"	1/16"	15,000 p.s.i.	X	X	
	¼"	1/8"	6,000 p.s.i.	X	X	
	3/8"	¼"	6,000 p.s.i.	X	X	
	½"	3/8"	4,000 p.s.i.	X	X	

PRESSURE GAUGES • GAUGE CONNECTORS





Standard pressure gauges are usually furnished with tapered or straight pipe threads. Autoclave Engineers maintains a stock of pressure gauges machined to its specifications with the ¼" AE-Cone connection which is, generally, more suitable for high pressure applications.

These are high quality bottom connected, back mounted, process grade gauges incorporating maximum safety features.

Solid front, dust and moisture proof, aluminum alloy cases, fitted with blow-out back panels, protect the viewer against Bourdon tube rupture. Stainless steel movements are standard. Pointer zero adjustment is located on front of gauge behind the plastic dial cover. Accuracy is within ½% of scale range. Bourdon tube materials are as listed in chart for maximum corrosion resistance consistent with strength requirements. Interchangeable dial cover retaining rings to permit panel mounting are stocked and will be furnished at no extra charge, if specified. Gauges are oil-free when shipped. Special cleaning for oxygen service can be accomplished at extra cost.

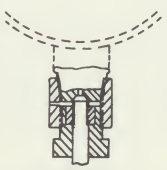
CATALOG NUMBER	RANGE P.S.I.	BOURDON TUBE MATERIAL	MINOR INTERVAL VALUE P.S.I.	CONNECTION	DIAL DIAM.
P478	0-600	316 S.S.	5	F250C	4½"
P499	0-1000	316 S.S.	10	F250C	4½"
P479	0-1600	316 S.S.	20	F250C	4½"
P468	0-2000	316 S.S.	20	F250C	4½"
P480	0-3000	316 S.S.	20	F250C	4½"
P481	0-5000	316 S.S.	50	F250C	4½"
P199	0-7500	316 S.S.	100	F250C	4½"
P447	0-7500	316 S.S.	100	¼" NPTM	4½"
P482	0-10000	316 S.S.	100	F250C	4½"
P483	0-15000	316 S.S.	100	F250C	4½"
P487	0-20000	316 S.S.	200	F250C	4½"
P488	0-30000	316 S.S.	250	F250C	6"
P489	0-50000	431 S.S.	1000	F250C	6"
P490	0-80000	431 S.S.	1000	F250C	6"

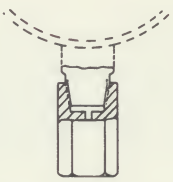
For lower pressure applications and where accuracy and corrosion requirements are less stringent, Autoclave Engineers stocks the 3½" industrial grade gauges listed below. Cases are phenolic, back mounted, bottom connected, turret type, with plastic dial covers. Accuracy is within 1% over middle half of range, 1½% over balance.

CATALOG NUMBER	RANGE P.S.I.	BOURDON TUBE MATERIAL	MINOR INTERVAL VALUE P.S.I.	CONNECTION	DIAL DIAM.
P670	0-1000	*403 S.S.	20	¼" NPTM	3½"
P671	0-1500	*403 S.S.	25	¼" NPTM	3½"
P672	0-3000	*403 S.S.	50	¼" NPTM	3½"
P673	0-5000	*403 S.S.	100	¼" NPTM	3½"
P821	0-8000	*403 S.S.	100	¼" NPTM	3½"

**316 S.S. Bourdon tubes available on special order. Shipment — approximately 12 weeks.*

GAUGE CONNECTORS





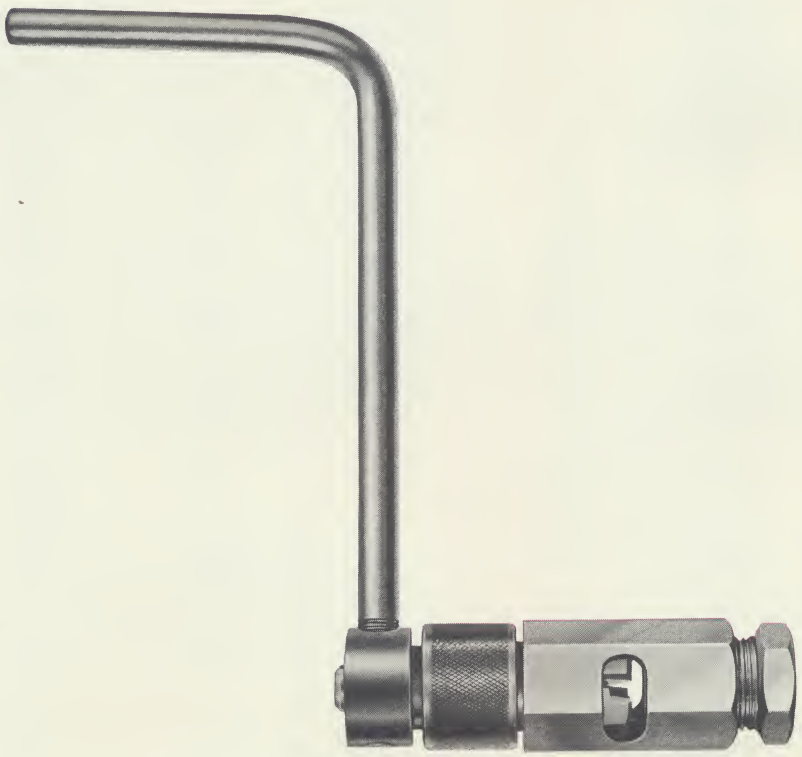
YOUR GAUGE HAS THIS SHANK-END CONNECTION →	F250C	¼" NPTM USING STEM CONE	½" NPTM USING STEM CONE	¾"—16 STRAIGHT THREAD	¼" NPTM NO CONE	½" NPTM NO CONE	½" NPS MALE
YOU WISH TO CONNECT GAUGE TO THIS SIZE TUBING ↓		CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER	CATALOG NUMBER
⅛" O.D. x 1/16" I.D.	Recommend			SG12200	6F4281	6F8281	SG8200
¼" O.D. x .083" I.D.	¼" x .083"	CG4400	CG4800	CG12400	6F4482	6F8482	CG8400
¼" O.D. x ⅛" I.D.	Nipple			SG12400	6F4482	6F8482	SG8400
5/16" O.D. x 1/16" I.D.	Adapted						
⅜" O.D. x ⅛" I.D.	at Other		CG6800	CG12600	6F4682	6F8682	CG8600
⅜" O.D. x ¼" I.D.	End to			SG12600	6F4682	6F8682	SG8600
½" O.D. x ⅜" I.D.	System			SG12800	6F4882	6F8882	SG8800
9/16" O.D. x 3/16" I.D.	Tubing		CG9800	CG12900	6F4983	6F8983	CG8900
9/16" O.D. x 5/16" I.D.	Size			CGX12906	6F4986	6F8986	CGX8906

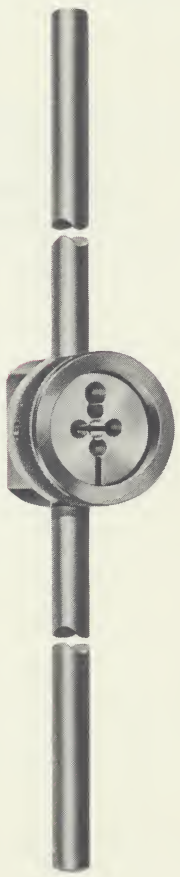
ALL AE GAUGE CONNECTORS FURNISHED WITH NECESSARY GLANDS AND COLLARS OR SLEEVES

AE CONING AND THREADING TOOLS

Autoclave Engineers manufactures two sizes of tools for optimum coning performance. These are precision quality manual tools to permit on-site tubing end preparation for AE-Cone installations. Interchangeable precision collets for each size tubing provide for proper centering of tubing exhibiting the normal variations allowable under Superpressure Quality specifications. The cutting feed arrangement permits the operator to control the depth of cut to assure against work hardening effects. Interchangeable tool steel cutting blades are used in pairs to assure more accurate and faster coning and are designed to square-off and finish the end of the tube as the cone is completed. There is provision for applying metal cutting lubricants to the cutting zone.

The threading die holder is designed to hold the appropriate high quality die for any of the standard AE tubing sizes. Interchangeable guide bushings properly guide the tool for accurate thread machining.





CONING TOOLS AND INTERCHANGEABLE COMPONENTS

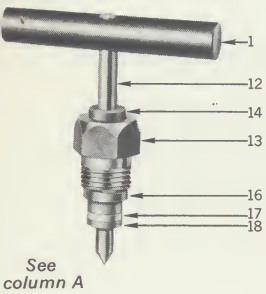
THREADING TOOLS AND INTERCHANGEABLE COMPONENTS

FOR USE WITH THESE TUBING CONNECTIONS		TUBING SIZE O.D. x I.D.	TOOL COMPLETE WITH COLLET AND BLADES CAT. NO.	TOOL ONLY CAT. NO.	*COLLET CAT. NO.	*CONING BLADES SET OF 2 CAT. NO.	TOOL COMPLETE WITH DIE AND BUSHING CAT. NO.	TOOL ONLY CAT. NO.	*THREADING DIE CAT. NO.	*THREADING DIE SIZE TYPE	*GUIDE BUSHING CAT. NO.
F250C	SF250C	¼" x .083"	401A	401	P187	10-884A	402A	402	P214	¼"-28LH Nat'l Fine	10-343A
F312C 100		5/16" x 1/16"	401B	401	P188	10-884B	402B	402	P205	5/16"-24LH Nat'l Fine	10-343C
F375C	SF375C	⅜" x ⅛"	401C	401	P189	10-971A	402C	402	P215	⅜"-24LH Nat'l Fine	10-344A
F562C	SF562C	9/16" x 3/16"	403B	403	P191	10-883A	402E	402	P216	9/16"-18LH Nat'l Fine	10-345A
F562CX	SF562CX	9/16" x 5/16"	403BX	403	P191	10-5218	402EX	402	P216	9/16"-18LH Nat'l Fine	10-345A

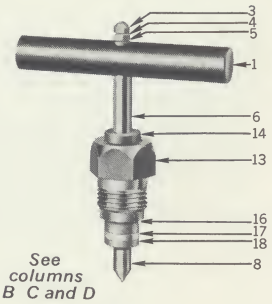
These components are interchangeable in basic tool as indicated by brackets.

SEE PAGES 42-49 FOR CONING AND THREADING INSTRUCTIONS AND SPECIFICATIONS

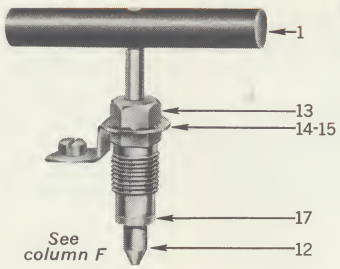
SPARE PARTS



See column A



See columns B C and D



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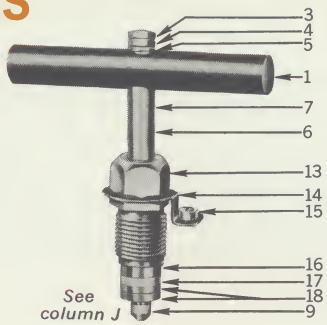

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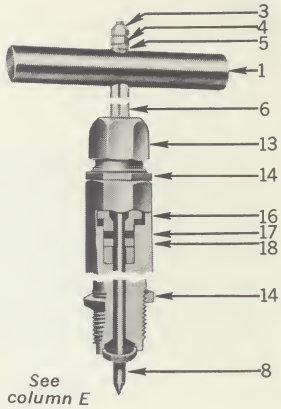


See column E

ITEM NO.	DESCRIPTION	A ⅛" SPACESAVER VALVES MATERIAL PART NUMBER	B ¼" SPACESAVER VALVES MATERIAL PART NUMBER	C ⅜" SPACESAVER VALVES MATERIAL PART NUMBER	D ½" SPACESAVER VALVES MATERIAL PART NUMBER	E SPEED VALVE & AE-30 HIGH TEMPERATURE STUFFING BOX MATERIAL PART NUMBER	F ⅛" SPEED-VALVES MATERIAL PART NUMBER	G ¼" & ⅜" SPEED-VALVES MATERIAL PART NUMBER
1	HANDLE	ALUMINUM 006	ALUMINUM 10-9246A	ALUMINUM 001	ALUMINUM 001	ALUMINUM 001	ALUMINUM 10-4732	ALUMINUM 001
2	HANDLE SET SCREW	STEEL P865	STEEL P866	STEEL 002	STEEL 002	STEEL 002	STEEL P865	STEEL 002
3	LOCK NUT	NONE	STEEL P717	STEEL P717	STEEL P717	STEEL P717	NONE	STEEL P717
4	PRE-LOADING NUT	NONE	STEEL P716	STEEL P716	STEEL P716	STEEL P716	NONE	STEEL P716
5	THRUST WASHER	NONE	17-4PH 10-7310C	17-4PH 10-7310C	17-4PH 10-7310D	17-4PH 10-7310C	NONE	17-4PH 10-7310C
6	STEM SLEEVE	NONE	410 S.S. 10-8946A	410 S.S. 10-7310A	410 S.S. 10-7310A	410 S.S. 10-7310A	NONE	410 S.S. 10-7310A
7	UPPER STEM	NONE	NONE	NONE	NONE	NONE	NONE	NONE
8	STEM (NEEDLE)	NONE	316 S.S. 10-9245A	316 S.S. 10-7637A	316 S.S. 10-7598A	316 S.S. 10-7777A	NONE	316 S.S. 10-8612A
8	STEM (TAPERED)	NONE	316 S.S. 10A409A	316 S.S. 10A409A	316 S.S. 10A410A	CONE RING 316 S.S. 10-7375A	NONE	316 S.S. 10A428A
9	LOWER STEM (NEEDLE)	NONE	NONE	NONE	NONE		NONE	NONE
9	LOWER STEM (TAPERED)	NONE	NONE	NONE	NONE		NONE	NONE
10	LOWER STEM (METERING)	NONE	NONE	NONE	NONE		NONE	NONE
11	ROLL PIN	NONE	NONE	NONE	NONE		NONE	NONE
12	ONE PIECE STEM	420 S.S. 10-4733	NONE	NONE	NONE		420 S.S. 10-4733	420 S.S. 008
12	NEEDLE STEM ASSEMBLY COMPLETE	NONE	10-7637	10-7637	10-7598	10A412A	NONE	0087
12	TAPERED STEM ASSEMBLY COMPLETE	NONE	10A411A	10A411A	10A411B	NONE	NONE	0088
12	METERING STEM ASSEMBLY COMPLETE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
13	PACKING GLAND	416 S.S. 10-7865A	416 S.S. 10-8762A	416 S.S. 10-7638A	416 S.S. 10-7638A	AMPCO 005A	416 S.S. 10A-379B	AMPCO 005A
13	ALTERNATE PACKING GLAND	NONE	NONE	NONE	NONE	416 S.S. 005S	NONE	416 S.S 005S
14	LOCKING DEVICE	304 S.S. 10-7865B	304 S.S. 10-8762B	304 S.S. 10-7638B	304 S.S. 10-7638B	416 S.S. 10-7375A	17-7PH 10A-379A	17-7PH 003A
15	LOCKING DEVICE SCREW	NONE	NONE	NONE	NONE	NONE	18-8 S.S. P860	18-8 S.S. 004
16	PACKING WASHER	304 S.S. 10-7865C	304 S.S. 026	304 S.S. 10-7638	304 S.S. 10-7597A	AMPCO 10-7310BA	NONE	AMPCO 040A
16	ALTERNATE PACKING WASHER	NONE	NONE	NONE	NONE	416 S.S. 10-7310BS	NONE	416 S.S. 040S
17	PACKING	TEFLON P492	TEFLON P128	TEFLON 10-7638E	TEFLON 10-7597C	DILECTO P466	DILECTO P825	TEFLON P128
18	BOTTOM WASHER	304 S.S. 10-7865D	304 S.S. 028	304 S.S. 10-7638D	304 S.S. 10-7597B	17-4PH* 20-4634C	NONE	304 S.S. 026
19	REPLACEABLE SEAT						316 S.S. 10A430B	17-4PH 053
20	SEAT RETAINER WITH ⅛" TUBING CONNECTION						316 S.S. 10A430C	NONE
20	SEAT RETAINER WITH ¼" TUBING CONNECTION						NONE	316 S.S. 10-6334A
20	SEAT RETAINER WITH ⅜" TUBING CONNECTION						NONE	316 S.S. 10-6334B
20	SEAT RETAINER WITH 9/16" TUBING CONNECTION						NONE	NONE

*When used with AE-30 valves spacer #10-1154B is required below bottom washer

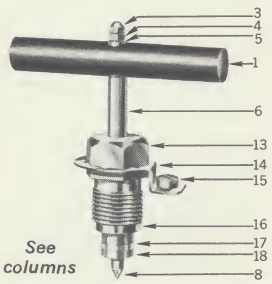
When used with speed-valves spacers #10-1154B and #024 are required below bottom washer

Both spacers are made of 17-4PH

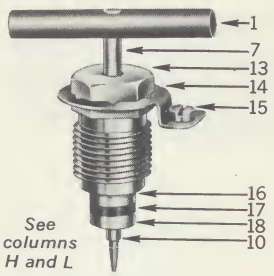
Items 1-18 are common to all body styles

Items 19-20 used only with replaceable seat angle types

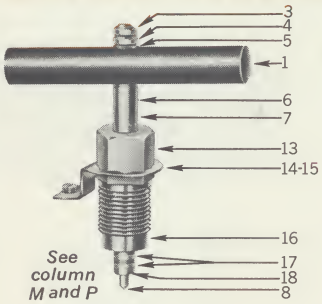
SPARE PARTS



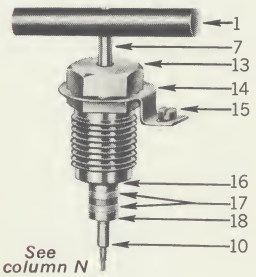
See columns G and K



See columns H and L



See column M and P



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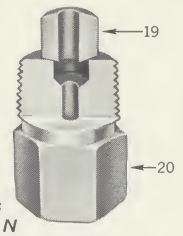
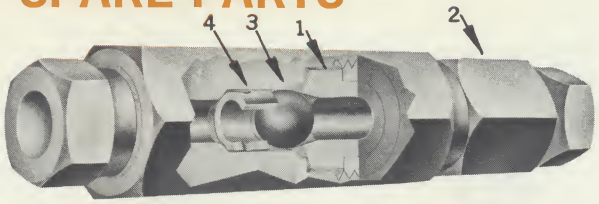


See columns F through N

H	J	K	L	M	N	P		ITEM NO.
1/8" METERING SPEED-VALVES	9/16" O.D. SLIM-LINE VALVES	AE-30 VALVES	1/4" METERING AE-30 VALVES	AE-60 VALVES	1/4" METERING AE-60 VALVES	AE-100 VALVES		
MATERIAL PART NUMBER	MATERIAL PART NUMBER	MATERIAL PART NUMBER	MATERIAL PART NUMBER	MATERIAL PART NUMBER	MATERIAL PART NUMBER	MATERIAL PART NUMBER	DESCRIPTION	
ALUMINUM 006	ALUMINUM 10-6945A	ALUMINUM 001	ALUMINUM 10-4732	ALUMINUM 001	ALUMINUM 10-4732	STEEL 10-3065B	HANDLE	1
STEEL P865	STEEL 002	STEEL 002	STEEL P865	STEEL 002	STEEL P865	STEEL 002	HANDLE SET SCREW	2
NONE	STEEL P861	STEEL P717	NONE	STEEL P717	NONE	STEEL P862	LOCK NUT	3
NONE	STEEL P861	STEEL P716	NONE	STEEL P716	NONE	STEEL P862	PRE-LOADING NUT	4
NONE	17-4PH 20-4015C	17-4PH 10-7310C	NONE	17-4PH 10-7310C	NONE	TOOL STEEL TOP 10-1477E BOTTOM 10-1477F	THRUST WASHER	5
NONE	416 S.S. 20-4015D	410 S.S. 10-7310A	NONE	410 S.S. 10-7310A	NONE	416 S.S. 30-1477B	STEM SLEEVE	6
416 S.S. 10-6879A	416 S.S. 20-4015A	NONE	416 S.S. 10-6879A	NONE	416 S.S. 10-6879A	416 S.S. 30-1477C	UPPER STEM	7
NONE	NONE	316 S.S. 10-8612A	NONE	17-4PH 10-9447A	NONE	Order 7 & 9 As Assembly #30-1477CD Listed Separately to Show Materials	STEM (NEEDLE)	8
NONE	NONE	316 S.S. 10A428A	NONE	NONE	NONE		STEM (TAPERED)	8
NONE	316 S.S. 20-4015L	NONE	NONE	NONE	NONE	High Speed Steel 30-1477D	LOWER STEM (NEEDLE)	9
NONE	316 S.S.** 10-7748B	NONE	NONE	NONE	NONE	NONE	LOWER STEM (TAPERED)	9
416 S.S. 10-6879C	NONE	NONE	416 S.S. 10-6879C	NONE	416 S.S. 10-9448B	NONE	LOWER STEM (METERING)	10
STEEL P863	STEEL P571	NONE	STEEL P863	NONE	STEEL P863	NONE	ROLL PIN	11
NONE	NONE	420 S.S. 008	NONE	NONE	NONE	NONE	ONE PIECE STEM	12
NONE	10A413A	0087	NONE	10A414A	NONE	10A416A	NEEDLE STEM ASSEMBLY COMPLETE	12
NONE	10A413B	0088	NONE	NONE	NONE	NONE	TAPERED STEM ASSEMBLY COMPLETE	12
10A433	NONE	NONE	10A433	NONE	10A415A	NONE	METERING STEM ASSEMBLY COMPLETE	12
416 S.S. 10A425B	416 S.S. 20-4634A	AMPCO 005A	416 S.S. 10-8298B	AMPCO 005A	416 S.S. 10-9726A	AMPCO 30-1477H	PACKING GLAND	13
NONE	NONE	416 S.S. 005S	NONE	416 S.S. 005S	NONE	NONE	ALTERNATE PACKING GLAND	13
MONEL P872	17-7PH 003A	17-7PH 003A	17-7PH 003A	17-7PH 003A	17-7PH 003A	17-7PH 003B	LOCKING DEVICE	14
18-8 S.S. P860	18-8 S.S. 004	18-8 S.S. 004	18-8 S.S. 004	18-8 S.S. 004	18-8 S.S. 004	18-8 S.S. 004	LOCKING DEVICE SCREW	15
17-4PH 10-6878CA	AMPCO 20-4634BA	AMPCO 040A	17-4PH 10-6878C	Packing Washer 17-4PH 30-1477L	Packing Washer 17-4PH 30-1477L	Packing Washer Beryllium Copper 30-1477K	PACKING WASHER	16
NONE	416 S.S. 20-4634BS	416 S.S. 040S	NONE	BACK-UP 410 S.S. 10-9447B	BACK-UP 410 S.S. 10-9447B	BACK-UP 410 S.S. 30-1477J	ALTERNATE PACKING WASHER	16
DILECTO P467	TEFLON P677	TEFLON P128	DILECTO P467	Nylon & Leather P864	Nylon & Leather P864	Nylon & Leather P864	PACKING	17
17-4PH 021	17-4PH 20-4634C	17-4PH 020	17-4PH 021	17-4PH 30-1477L	17-4PH 30-1477L	Beryllium Copper 30-1477K	BOTTOM WASHER	18
316 S.S. 10-6878E	316 S.S. 10A406B	17-4PH 053	316 S.S. 10-6878E	17-4PH 10-9446A	17-4PH 10-9446A	NONE	REPLACEABLE SEAT	19
316 S.S. 10A425C	NONE	NONE	NONE	NONE	NONE	NONE	SEAT RETAINER WITH 1/8" TUBING CONNECTION	20
NONE	NONE	316 S.S. 063	316 S.S. 10-8298C	316 S.S. 10-9476A	316 S.S. 10-9476A	NONE	SEAT RETAINER WITH 1/4" TUBING CONNECTION	20
NONE	NONE	316 S.S. 064	NONE	316 S.S. 10-9477A	NONE	NONE	SEAT RETAINER WITH 3/8" TUBING CONNECTION	20
NONE	316 S.S. 10A406C	316 S.S. 065	NONE	316 S.S. 10-9478A	NONE	NONE	SEAT RETAINER WITH 9/16" TUBING CONNECTION	20

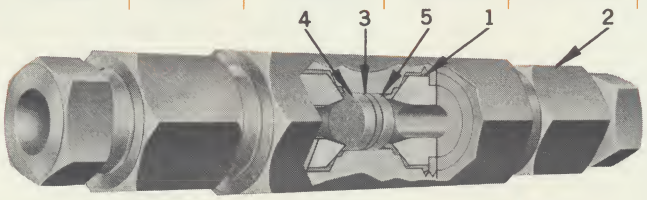
***This lower stem (tapered) will not fit old style 15SV9002 valve which is no longer sold.*

SPARE PARTS



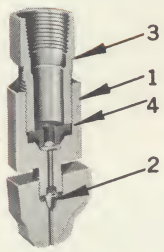
BALL CHECK VALVE

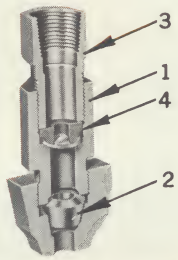
ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SB2201	1/4" ERMETO SB4401	3/8" ERMETO SB6601	1/2" ERMETO SB8801	1/4" AE-CONE CB4401	3/8" AE-CONE CB6601	9/16" x 3/16" AE-CONE CB9901	9/16" x 5/16" AE-CONE CBX9901
1	Cover	316 S.S.	10-6873D	10-6904C	10-6903C	10-8764B	30-1678D	30-1678E	30-1678F	10A408B
2	Nut	416 S.S.	10-6873A	10-6904B	10-6903B	10-8764C	20-6184D	20-6184E	20-6183C	10A408C
3	Ball	302 S.S.	P453	P833	P833	P766	P453	P448	P833	P766
4	Poppet	316 S.S.	10-4548A	10A404A	10A404A	10A404C	10-4548A	30-1678G	10A404A	10A404C

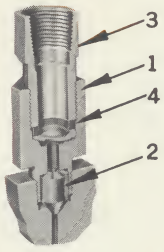


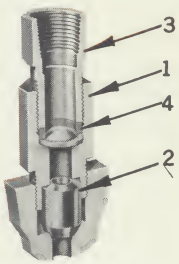
LINE FILTERS

ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SLF2200	1/4" ERMETO SLF4400	3/8" ERMETO SLF6600	1/2" ERMETO SLF8800	1/4" AE-CONE CLF4400	3/8" AE-CONE CLF6600	9/16" x 3/16" AE-CONE CLF9900	9/16" x 5/16" AE-CONE CLFX9900
1	Cover	316 S.S.	10-6873D	10-6904C	10-6903C	10-8764B	20-6184C	20-6184B	20-6183B	10-8304B
2	Nut	416 S.S.	10-6873A	10-6904B	10-6903B	10-8764C	20-6184D	20-6184C	20-6183C	10-8304A
3	Spacer	316 S.S.	P762	P763	P763	P765	P762	P762	P763	P765
4	Filter—35 Microns	304 S.S.	P870	P871	P871	P794	P804	P804	P805	P794
5	Filter—65 Microns	304 S.S.	P562	P650	P650	P764	P803	P803	P650	P764





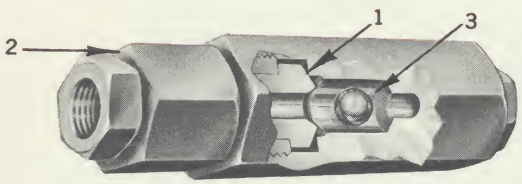




UNIVERSAL SAFETY HEAD ASSEMBLIES

(PLUGS, ITEM 2, ALSO USED WITH **M-F ADAPTERS**)

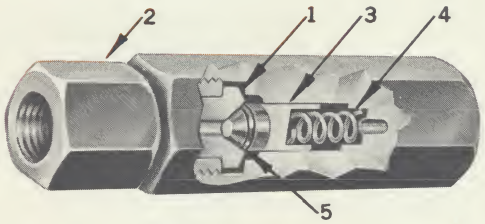
ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SS2600	1/4" ERMETO SS4600	3/8" EMERTO SS6600	1/2" ERMETO SS8600	1/4" AE-CONE CS4600	3/8" AE-CONE CS6600	9/16" x 3/16" AE-CONE CS9600	9/16" x 5/16" AE-CONE CSX9600
1	Body	316 SS.	20-7035A	20-7035B	20-7035C	20-7035D	20-7036A	20-7036B	20-7036C	10A-438A
2	Plug	316 SS.	10A-434A	10A-434B	10A-434C	10A-434D	10-4877A	10-6096C	10-6097C	10A-438B
3	Hold Down Nut	416 SS.	10-7434A	10-7434A	10-7434A	10-7434A	10-7434A	10-7434A	10-7434A	10-7434A
4	Hold Down Ring	Tool Steel	3/16" FLAT 10A-439A • 1/4" ANGLE 10A-439B • 7/16" FLAT 10-8353 • 1/2" FLAT 10-7434B							



GAUGE OR LINE SURGE CHECK VALVE

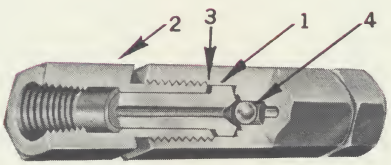
ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SK2202	1/4" ERMETO SK4402	3/8" ERMETO SK6602	1/2" ERMETO SK8802	1/4" AE-CONE CK4402	3/8" AE-CONE CK6602	9/16" x 3/16" AE-CONE CK9902	9/16" x 5/16" AE-CONE CKX9902
1	Cover	316 S.S.	10-6873D	10-6904C	10-6903C	10-8764B	30-1678D	30-1678E	30-1678F	10A408B
2	Nut	416 S.S.	10-6873A	10-6904B	10-6903B	10-8764C	20-6184D	20-6184E	20-6183C	10A408C
3	Ball	302 S.S.	P453	P833	P833	P766	P453	P448	P833	P766

SPARE PARTS



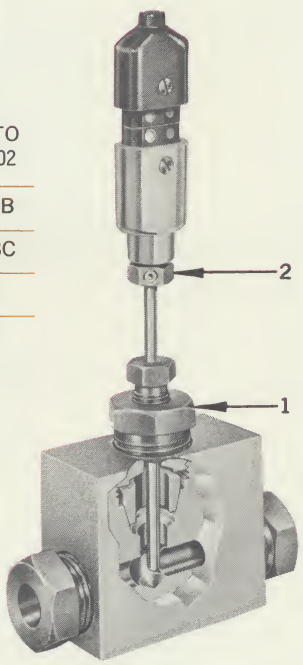
O-RING CHECK VALVE

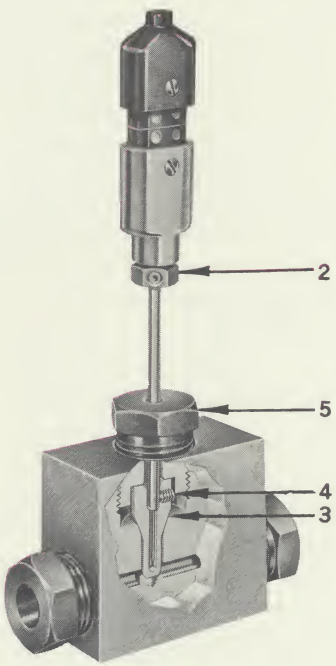
ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SKO2200	1/4" ERMETO SKO4400	3/8" ERMETO SKO6600	1/2" ERMETO SKO8800	1/4" AE-CONE CKO4400	3/8" AE-CONE CKO6600	9/16" x 3/16" AE-CONE CKO9900	9/16" x 5/16" AE-CONE CKOX9901
1	Cover	316 S.S.	10-6873D	10-6904C	10-6903C	10-8764B	30-1678D	30-1678E	30-1678F	10A408B
2	Nut	416 S.S.	10-6873A	10-6904B	10-6903B	10-8764C	20-6184D	20-6184E	20-6183C	10A408C
3	Poppet	316 S.S.	10-7234C	10-6902C	10-6902C	10-8764D	10-7234C	10-7923C	10-6902C	10-8764D
4	Spring	302 S.S.	P836	P858	P858	P858	P836	P859	P858	P858
5	O-Ring	BUNA-N	P846	P848	P848	P849	P846	P847	P848	P849
5	O-Ring	VITON	P850	P852	P852	P853	P850	P851	P852	P853
5	O-Ring	TEFLON	P854	P856	P856	P857	P854	P855	P856	P857



GAUGE SURGE CHECK VALVE

ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO SGK2402	1/4" ERMETO SGK4402	3/8" ERMETO SGK6402
1	Cover	316 S.S.	10-8763B	10-8763B	10-8763B
2	Nut	316 S.S.	10-8763C	10-8763C	10-8763C
3	Gasket	316 S.S.	P761	P761	P761
4	Ball	302 S.S.	P461	P461	P461





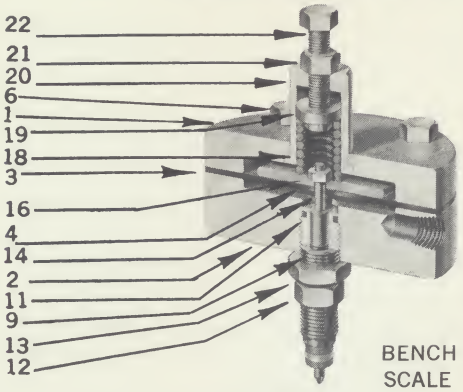
THERMOCOUPLE ASSEMBLIES

ITEM NO.	DESCRIPTION	MATERIAL	1/8" ERMETO STC2200 STC2201	1/4" ERMETO STC4400 STC4401	3/8" ERMETO STC6600 STC6601	1/2" ERMETO STC8800 STC8801	1/4" AE-CONE CTC4400 CTC4401	3/8" AE-CONE CTC6600 CTC6601	9/16" x 3/16" AE-CONE CTC9900 CTC9901	9/16" x 5/16" AE-CONE CTCX9900 CTCX9901
1	Adapter	316 S.S.	NONE	10A361A	10A361B	10A361C				10A405A
2	Pencil Iron Constantan	316 S.S.	P834	P834	P834	P834	P835	P835	P835	P494
3	Probe	316 S.S.					10-9451A	10-9451A	10-9451A	
4	Set Screw	STEEL					P869	P869	P869	
5	Gland	416 S.S.					10-9451B	10-9451B	10-9451B	

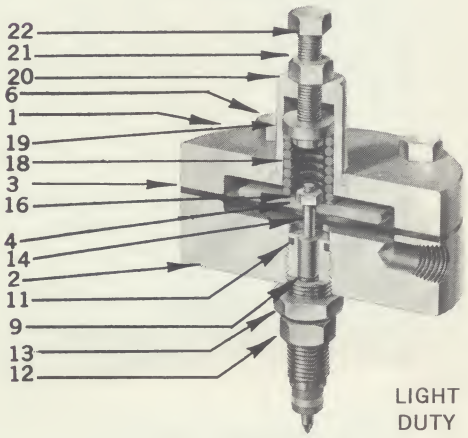
SPARE PARTS
AIR OPERATORS

ITEM NO.	DESCRIPTION	AIR TO OPEN TYPE				AIR TO CLOSE TYPE			
		BENCH SCALE	LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY	BENCH SCALE	LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY
1	HOUSING—upper	20-6245A	20-6281A	20-5686A	30-1897A	10-9556A	20-5237A	20-6922B	30-1897E
2	HOUSING—lower	20-6245B	20-6281B	20-5686B	30-1897B	10-9556B	10-9591A	20-6922A	30-1897F
3	DIAPHRAGM—for Slim-Line 9/16"	NONE	NONE	NONE	30-2023D	NONE	NONE	NONE	30-2023D
	DIAPHRAGM—for all others	20-5240C	30-1414C	10A326C	30-1897D	20-5240D	30-1414D	10A326B	30-1897D
4	DIAPHRAGM HEAD—for Slim-Line 9/16"	NONE	NONE	NONE	30-2023C	NONE	NONE	NONE	30-2023C
	DIAPHRAGM HEAD—for all others	20-5244D	20-6281E	10A326A	10-9820A	20-5244D	10-9591C	10A326A	10-9820A
5	SPACER	NONE	NONE	NONE	30-1897C	NONE	NONE	NONE	30-1897C
6	HOUSING BOLT	P843	P839	P837	P880	P734	P742	P837	P880
7	HOUSING BOLT LOCK WASHER	P845	P841	P841	P882	P845	P841	P841	P882
8	HOUSING BOLT NUT	P735	P732	P840	P881	P735	P732	P840	P881
9	"O" RING—stem	P846	P847	P847	P867	NONE	NONE	NONE	NONE
10	INSERT—for Slim-Line 9/16"	NONE	NONE	NONE	30-2023H	NONE	NONE	NONE	10-9965A
	INSERT—for all others	NONE	NONE	NONE	10-9965B	NONE	NONE	NONE	10-9965A
11	"O" Ring—housing	P849	P886	P885	P874	NONE	NONE	NONE	NONE
12	GLAND—for Speed Valve 1/8"	20-6245D	NONE	NONE	NONE	20-6245E	NONE	NONE	NONE
	GLAND—for Speed Valve 1/4" & 3/8"	NONE	20-6281D	10-9841A	NONE	NONE	20-5237C	10-7428A	NONE
	GLAND—for SpaceSaver 1/8"	NONE	20-7043B	20-7040B	NONE	NONE	20-7043A	20-7040A	NONE
	GLAND—for SpaceSaver 1/4"	NONE	20-7042B	20-7039B	NONE	NONE	20-7042A	20-7039A	NONE
	GLAND—for SpaceSaver 3/8"	NONE	20-7041B	20-7038B	NONE	NONE	20-7041A	20-7038A	NONE
	GLAND—for SpaceSaver 1/2"	NONE	NONE	20-7038B	NONE	NONE	NONE	20-7038A	NONE
	GLAND—for Slim-Line 9/16"	NONE	NONE	10A164A	30-2023B	NONE	NONE	10-8974A	30-2023A
	GLAND—for AE30 1/4", 3/8" & 9/16"	NONE	20-6281D	10-9841A	10-9964A	NONE	20-5237C	10-7428A	10-9964B
	GLAND—for AE60 1/4", 3/8" & 9/16"	NONE	NONE	10-9841A	10-9964A	NONE	NONE	10-7428A	10-9964B
	GLAND—for AE100 5/16"	NONE	NONE	20-7037B	20-6485E	NONE	NONE	20-7037A	30-1897H
13	GLAND LOCK NUT	20-6245F	20-6281G	10-9841B	P868	NONE	NONE	NONE	NONE
14	STEM—for Speed Valve 1/8"	20-6245G	NONE	NONE	NONE	20-6245H	NONE	NONE	NONE
	STEM—for Speed Valve 1/4" & 3/8"	NONE	20-5583C	10-9050C	NONE	NONE	10-9591B	10-9050D	NONE
	STEM—for SpaceSaver 1/8"	NONE	20-7043D	20-7040D	NONE	NONE	20-7043C	20-7040C	NONE
	STEM—for SpaceSaver 1/4"	NONE	20-7042D	20-7039D	NONE	NONE	20-7042C	20-7039C	NONE
	STEM—for SpaceSaver 3/8"	NONE	20-7041D	20-7038F	NONE	NONE	20-7041C	20-7038E	NONE
	STEM—for SpaceSaver 1/2"	NONE	NONE	20-7038D	NONE	NONE	NONE	20-7038C	NONE
	STEM—for Slim-Line 9/16"	NONE	NONE	10-8975E	30-2023F	NONE	NONE	10-8975F	30-2023E
	STEM—for AE30 1/4", 3/8" & 9/16"	NONE	20-5583E	10-9050C	10A440A	NONE	10-9591E	10-9050D	10A440A
	STEM—for AE60 1/4", 3/8" & 9/16"	NONE	NONE	20-7037D	10-9963A	NONE	NONE	20-7037C	10-9963A
	STEM—for AE100 5/16"	NONE	NONE	20-7037D	10-9963A	NONE	NONE	20-7037C	10-9963A
15	STEM WASHER	NONE	NONE	NONE	P876	P850	P832	NONE	NONE
16	LOCK NUT—stem	P716	P716	P729	P875	P716	P729	P862	P875
17	SPACER GASKET	NONE	NONE	NONE	30-1897G	NONE	NONE	NONE	30-1897G
18	SPRING	P807	P808	P683	P877	P733	P831	P680	P883
19	SPRING SUPPRESSOR	20-5244I	30-1414S	10-8912B	10-9239A	NONE	NONE	NONE	NONE
20	SPRING HOUSING	20-6245C	20-6281C	10-8916A	10-9234A	NONE	NONE	NONE	NONE
21	LOCK NUT—spring	P735	P844	P878	P878	NONE	NONE	NONE	NONE
22	SPRING ADJUSTER BOLT	P811	P810	P884	P879	NONE	NONE	NONE	NONE
23	STOP BRACKET—for Slim-Line 9/16"	NONE	NONE	NONE	NONE	NONE	NONE	NONE	30-2023G
	STOP BRACKET—for all others	NONE	NONE	NONE	NONE	NONE	NONE	NONE	20-6485D

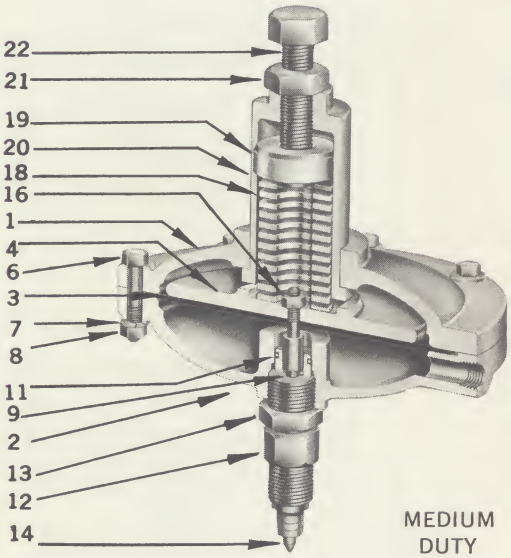
AIR-TO-OPEN TYPE



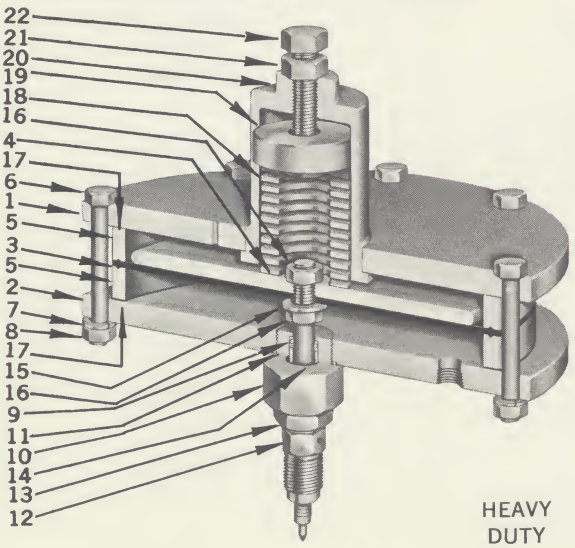
BENCH SCALE



LIGHT DUTY

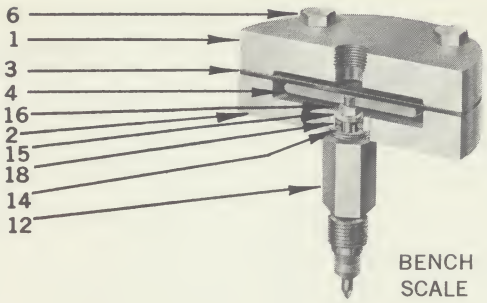


MEDIUM DUTY

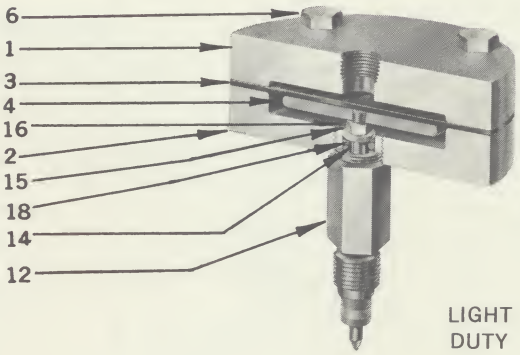


HEAVY DUTY

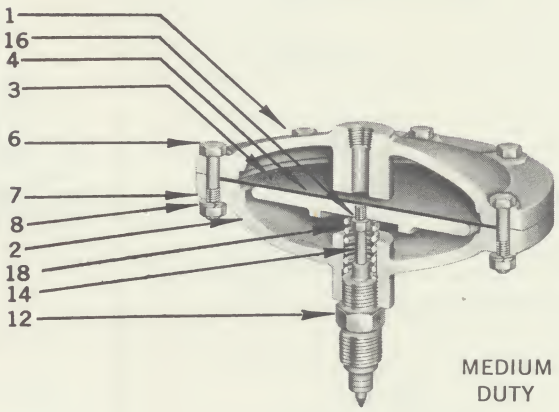
AIR-TO-CLOSE TYPE



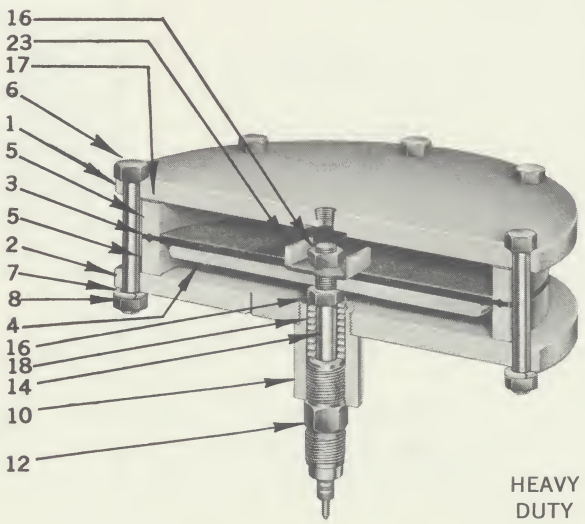
BENCH SCALE



LIGHT DUTY



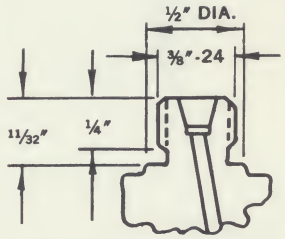
MEDIUM DUTY



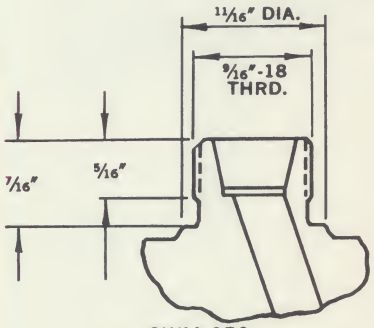
HEAVY DUTY

DIMENSIONS

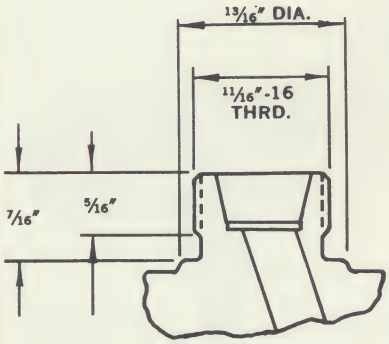
CONNECTION DETAILS



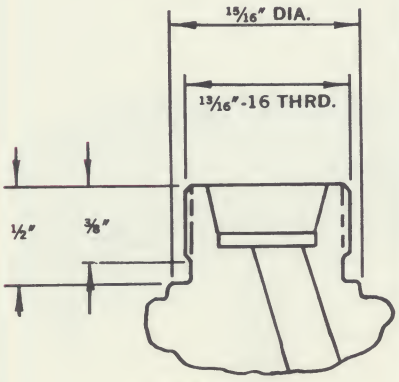
SWM-125
SLIM-LINE ERMETO



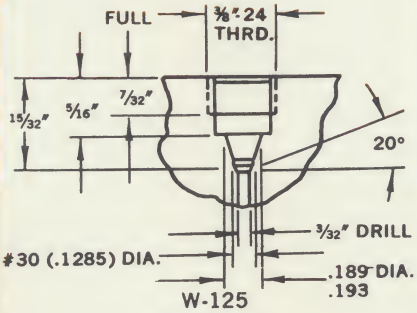
SWM-250
SLIM-LINE ERMETO



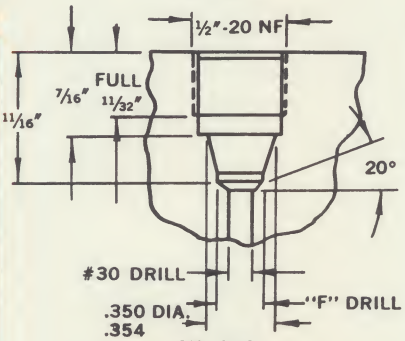
SWM-375
SLIM-LINE ERMETO



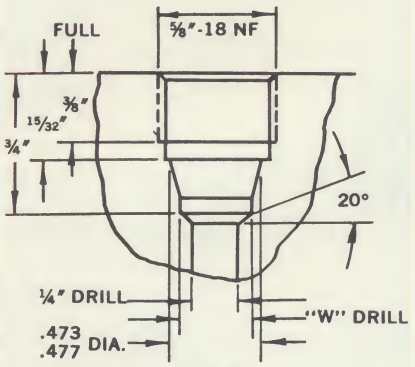
SWM-500
SLIM-LINE ERMETO



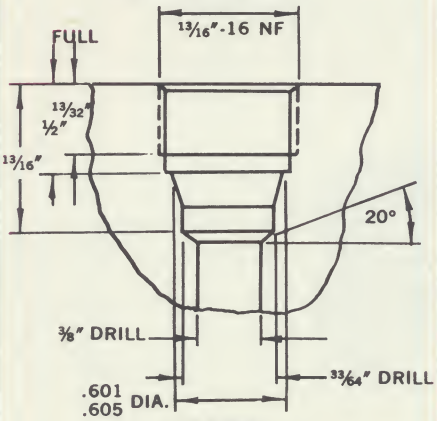
W-125
ERMETO



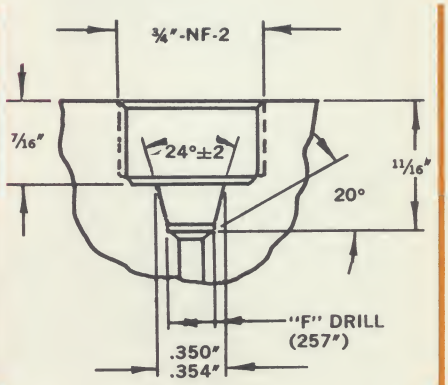
SW-250
SLIM-LINE ERMETO



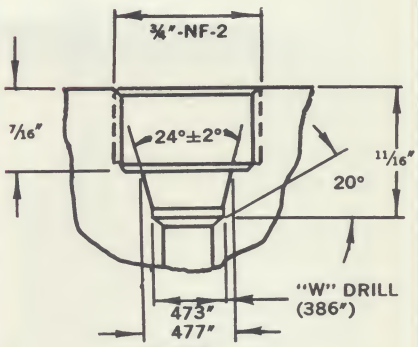
SW-375
SLIM-LINE ERMETO



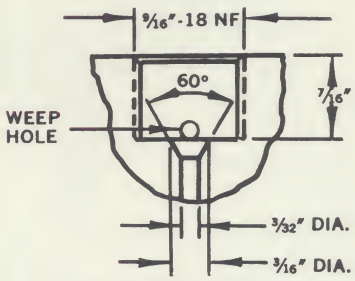
SW-500
SLIM-LINE ERMETO



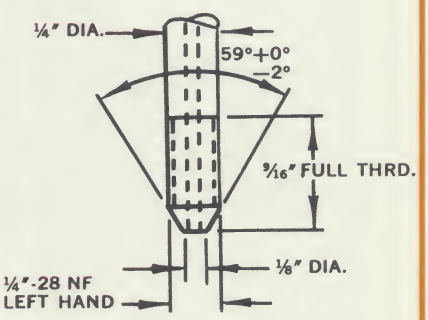
W-250
ERMETO



W-375
ERMETO



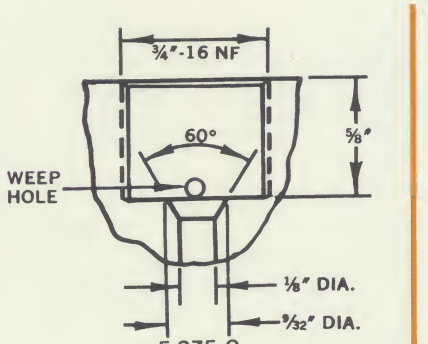
F-250-C
AE-CONE



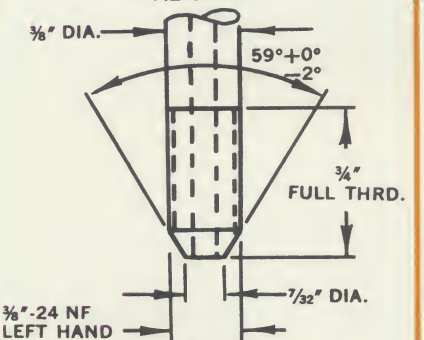
M-250-C
AE-CONE

DIMENSIONS

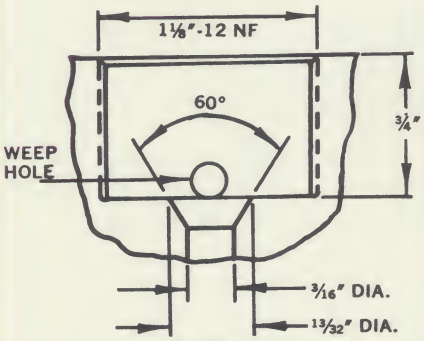
CONNECTION DETAILS



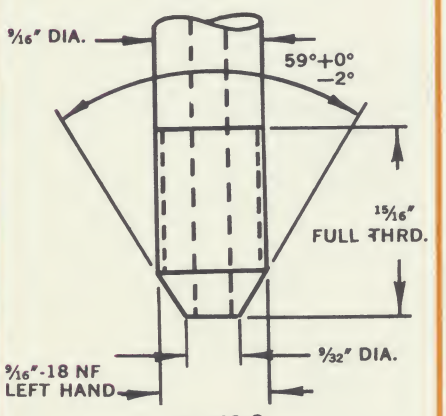
F-375-C
AE-CONE



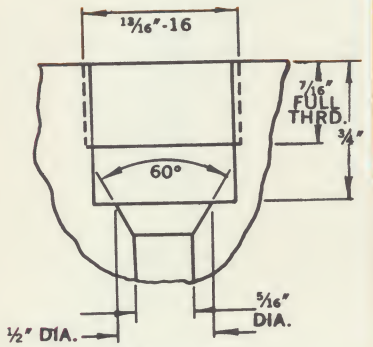
M-375-C
AE-CONE



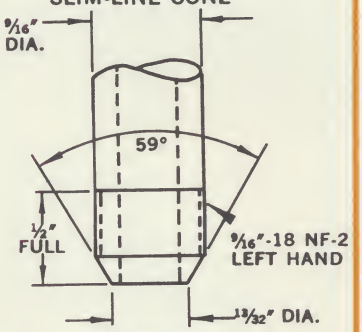
F-562-C
AE-CONE



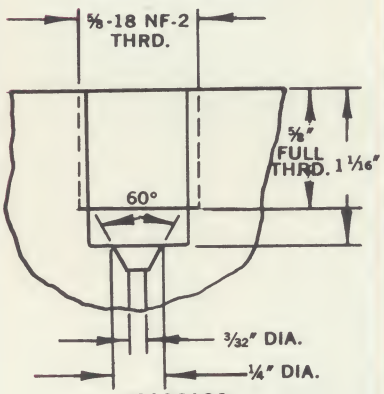
M-562-C
AE-CONE



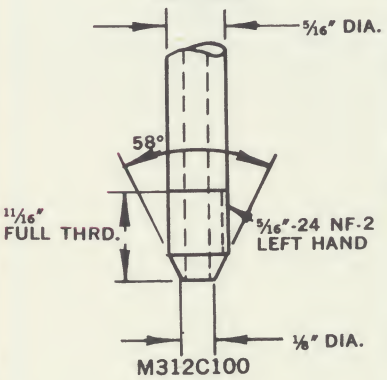
SF-562-CX
SLIM-LINE CONE



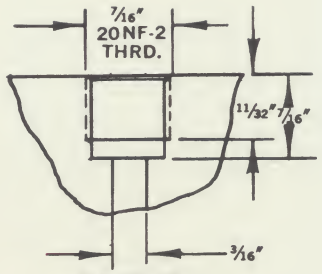
SM-562-CX
SLIM-LINE CONE



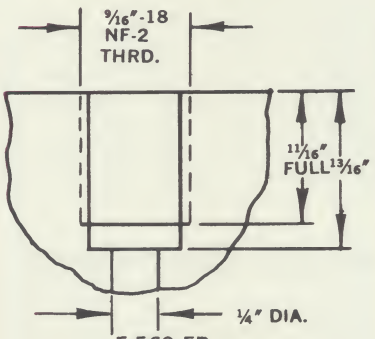
F312C100
AE-CONE



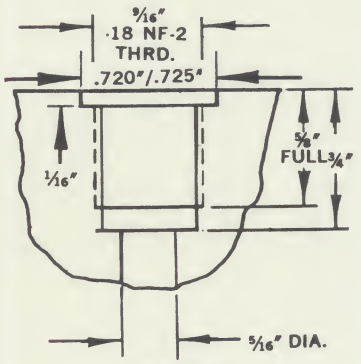
M312C100
AE-CONE



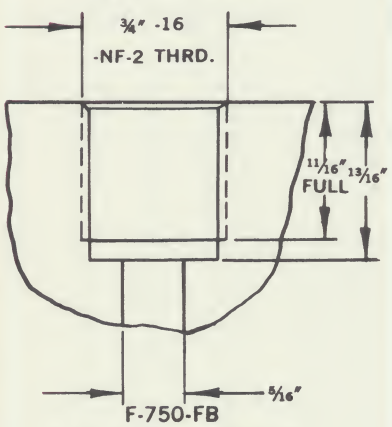
F-437-FB
FLAT BOTTOM GASKET



F-562-FB
FLAT BOTTOM GASKET



F-562-FT
FLAT TOP GASKET

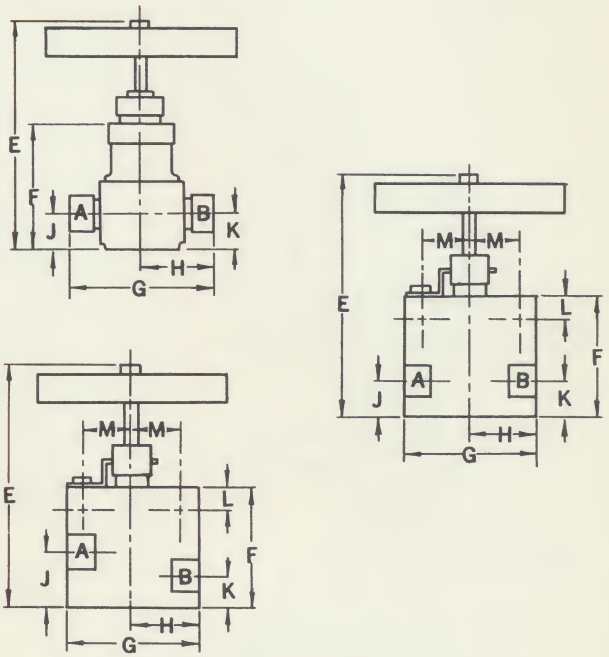


F-750-FB
FLAT BOTTOM GASKET

DIMENSIONS

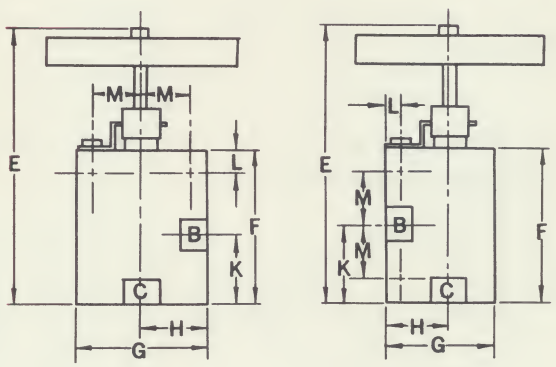
TWO-WAY STRAIGHT VALVES

Cat. No.	A - B	E	F	G	H	J	K	L	M	Block Thk.
10V-2001	W-125	2 7/16	1 1/4	1 3/8	11/16	9/16	5/16	1/4	1/2	1/2
10V-4071	W-250	4 1/16	1 11/16	1 3/16	19/32	1/2	1/2	3/8	11/16	1
10V-6071	W-375	4 1/16	1 11/16	1 3/16	19/32	1/2	1/2	3/8	11/16	1
10V-4081	W-250	4 1/16	1 11/16	1 3/16	19/32	1/2	1/2	3/8	11/16	1
10V-6081	W-375	4 1/16	1 11/16	1 3/16	19/32	1/2	1/2	3/8	11/16	1
12V-2001	SWM-125	2 3/8	1 5/16	1 1/2	3/4	3/8	3/8			3/4
12V-4071	SWM-250	3 7/16	1 7/16	1 3/4	7/8	3/8	3/8			3/4
12V-6071	SWM-375	4 1/8	1 3/4	2	1	1/2	1/2			1
12V-8071	SWM-500	4 3/16	1 51/64	2 1/8	1 1/16	35/64	35/64			1 3/32
12V-4081	SWM-250	3 7/16	1 7/16	1 3/4	7/8	3/8	3/8			3/4
12V-6081	SWM-375	4 1/8	1 3/4	2	1	1/2	1/2			1
12V-8081	SWM-500	4 3/16	1 51/64	2 1/8	1 1/16	35/64	35/64			1 3/32
15SV-9071	SF-562-CX	5 7/16	2 5/8	2 1/2	1 1/4	1/2	1 1/8	1/2	11/16	1
15SV-9081	SF-562-CX	5 7/16	2 5/8	2 1/2	1 1/4	1/2	1 1/8	1/2	11/16	1
30VM-4071	F-250-C	4 3/8	2	2	1	7/8	1/2	3/8	11/16	1
30VM-6071	F-375-C	4 3/8	2	2	1	7/8	1/2	3/8	11/16	1
30VM-9071	F-562-C	4 13/16	2 7/16	2 5/8	1 5/16	1 5/16	7/8	3/8	11/16	1 1/2
30VM-4081	F-250-C	4 3/8	2	2	1	7/8	1/2	3/8	11/16	1
30VM-6081	F-375-C	4 3/8	2	2	1	7/8	1/2	3/8	11/16	1
30VM-9081	F-562-C	4 13/16	2 7/16	2 5/8	1 5/16	1 5/16	7/8	3/8	11/16	1 1/2
60VM-4071	F-250-C	4 1/2	2 1/8	2	1	13/16	7/16	3/8	11/16	1
60VM-6071	F-375-C	4 5/8	2 1/4	2	1	1 5/16	9/16	3/8	11/16	1
60VM-9071	F-562-C	4 7/8	2 1/2	2 5/8	1 5/16	1 3/16	3/4	3/8	11/16	1 1/2
100V-5071	F-312-C100	5 1/8	2 1/4	3	1 1/2	1/2	13/16	1/2	1 1/8	1 1/4



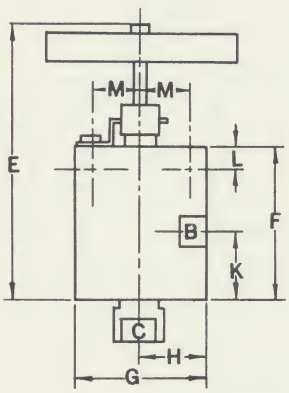
TWO-WAY ANGLE VALVES

Cat. No.	B - C	E	F	G	H	K	L	M	Block Thk.
10V-2002	W-125	2 9/16	1 3/8	1 3/8	11/16	11/16	1/4	1/2	1/2
10V-4072	W-250	4 9/16	2 3/16	1 1/2	1/2	1	5/16	11/16	1
10V-6072	W-375	4 9/16	2 3/16	1 1/2	1/2	1	5/16	11/16	1
10V-4082	W-250	4 9/16	2 3/16	1 1/2	1/2	1	5/16	11/16	1
10V-6082	W-375	4 9/16	2 3/16	1 1/2	1/2	1	5/16	11/16	1
15SV-9072	SF-562-CX	5 13/16	3	2 1/2	1 1/4	1 1/2	1/2	11/16	1
15SV-9082	SF-562-CX	5 13/16	3	2 1/2	1 1/4	1 1/2	1/2	11/16	1
30VM-4072	F-250-C	4 3/8	2	2	1	7/8	3/8	11/16	1
30VM-6072	F-375-C	4 1/2	2 1/8	2	1	1	3/8	11/16	1
30VM-9072	F-562-C	4 13/16	2 7/16	2 5/8	1 5/16	1 5/16	3/8	11/16	1 1/2
30VM-4082	F-250-C	4 3/8	2	2	1	7/8	3/8	11/16	1
30VM-6082	F-375-C	4 1/2	2 1/8	2	1	1	3/8	11/16	1
30VM-9082	F-562-C	4 13/16	2 7/16	2 5/8	1 5/16	1 5/16	3/8	11/16	1 1/2
60VM-4072	F-250-C	4 3/4	2 3/8	2	1	1 1/16	3/8	11/16	1
60VM-6072	F-375-C	5	2 5/8	2	1	1 5/16	3/8	11/16	1
60VM-9072	F-562-C	5 3/16	2 13/16	2 5/8	1 5/16	1 1/2	3/8	11/16	1 1/2
100V-5072	F-312-C100	5 3/4	2 7/8	2 1/4	1 1/2	1 7/16	3/8	15/16	1 1/4



TWO-WAY ANGLE VALVES—REPLACEABLE SEAT

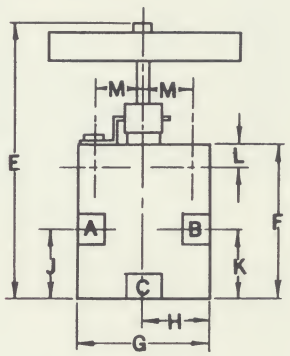
Cat. No.	B - C	E	F	G	H	K	L	M	Block Thk.
10V-2802	W-125	3 1/16	1 3/8	1 3/8	11/16	11/16	1/4	1/2	1/2
10V-4872	W-250	5 3/4	2 1/4	2	1	1 1/8	3/8	11/16	1
10V-6872	W-375	5 3/4	2 1/4	2	1	1 1/8	3/8	11/16	1
10V-4882	W-250	5 3/4	2 1/4	2	1	1 1/8	3/8	11/16	1
10V-6882	W-375	5 3/4	2 1/4	2	1	1 1/8	3/8	11/16	1
15SV-9872	SF-562-CX	6 9/16	2 5/8	2 1/2	1 1/4	1 1/8	1/2	11/16	1
15SV-9882	SF-562-CX	6 9/16	2 5/8	2 1/2	1 1/4	1 1/8	1/2	11/16	1
30VM-4872	F-250-C	5 9/16	2 3/8	2	1	1 1/4	3/8	11/16	1
30VM-6872	F-375-C	5 13/16	2 3/8	2	1	1 1/4	3/8	11/16	1
30VM-9872	F-562-C	6 1/8	2 7/16	2 5/8	1 5/16	1 1/4	3/8	11/16	1 1/2
30VM-4882	F-250-C	5 9/16	2 3/8	2	1	1 1/4	3/8	11/16	1
30VM-6882	F-375-C	5 13/16	2 3/8	2	1	1 1/4	3/8	11/16	1
30VM-9882	F-562-C	6 1/8	2 7/16	2 5/8	1 5/16	1 1/4	3/8	11/16	1 1/2
60VM-4872	F-250-C	5 13/16	2 5/8	2	1	1 5/16	3/8	11/16	1
60VM-6972	F-375-C	6 1/16	2 5/8	2	1	1 5/16	3/8	11/16	1
60VM-9872	F-562-C	6 7/16	2 5/8	2 5/8	1 5/16	1 5/16	3/8	11/16	1 1/2



DIMENSIONS

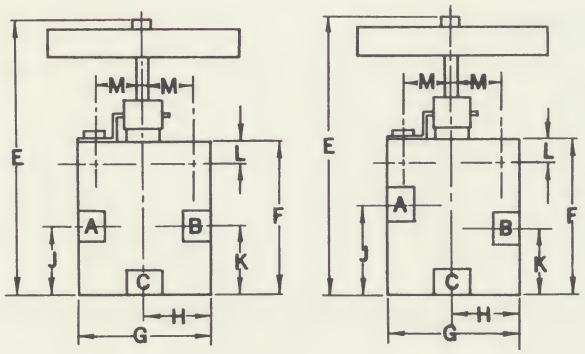
THREE-WAY VALVE—ONE CONNECTION ON PRESSURE

Cat. No.	A - B - C	E	F	G	H	J	K	L	M	Block Thk.
10V-2004	W-125	2 9/16	1 3/8	1 3/8	11/16	11/16	11/16	1/4	1/2	1/2
10V-4074	W-250	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-6074	W-375	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-4084	W-250	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-6084	W-375	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
15SV-9074	SF-562-CX	5 13/16	3	2 1/2	1 1/4	1 1/2	1 1/2	1/2	11/16	1
15SV-9084	SF-562-CX	5 13/16	3	2 1/2	1 1/4	1 1/2	1 1/2	1/2	11/16	1
30VM-4074	F-250-C	4 3/8	2	2	1	7/8	7/8	3/8	11/16	1
30VM-6074	F-375-C	4 1/2	2 1/8	2	1	1	1	3/8	11/16	1
30VM-9074	F-562-C	4 13/16	2 7/16	2 5/8	15/16	15/16	15/16	3/8	11/16	1 1/2
30VM-4084	F-250-C	4 3/8	2	2	1	7/8	7/8	3/8	11/16	1
30VM-6084	F-375-C	4 1/2	2 1/8	2	1	1	1	3/8	11/16	1
30VM-9084	F-562-C	4 13/16	2 7/16	2 5/8	15/16	15/16	15/16	3/8	11/16	1 1/2
60VM-4074	F-250-C	4 3/4	2 3/8	2	1	1 1/16	1 1/16	3/8	11/16	1
60VM-6074	F-375-C	5	2 5/8	2	1	15/16	15/16	3/8	11/16	1
60VM-9074	F-562-C	5 3/16	2 13/16	2 5/8	15/16	1 1/2	1 1/2	3/8	11/16	1 1/2



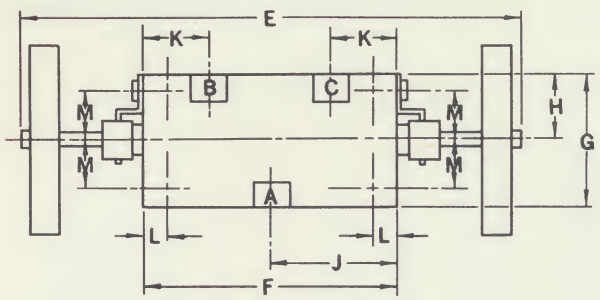
THREE-WAY VALVE—TWO CONNECTIONS ON PRESSURE

Cat. No.	A - B - C	E	F	G	H	J	K	L	M	Block Thk.
10V-2003	W-125	2 11/16	1 1/2	1 3/8	11/16	13/16	9/16	1/4	1/2	1/2
10V-4073	W-250	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-6073	W-375	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-4083	W-250	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
10V-6083	W-375	4 9/16	2 3/16	2	1	1	1	3/8	11/16	1
15SV-9073	SF-562-CX	6 1/8	3 3/8	2 1/2	1 1/4	1 7/8	1 1/4	1/2	11/16	1
15SV-9083	SF-562-CX	6 1/8	3 3/8	2 1/2	1 1/4	1 7/8	1 1/4	1/2	11/16	1
30VM-4073	F-250-C	4 1/2	2 1/8	2	1	1	5/8	3/8	11/16	1
30VM-6073	F-375-C	4 7/8	2 1/2	2	1	1 3/8	1	3/8	11/16	1
30VM-9073	F-562-C	5 1/4	2 7/8	2 5/8	15/16	1 3/4	15/16	3/8	11/16	1 1/2
30VM-4083	F-250-C	4 1/2	2 1/8	2	1	1	5/8	3/8	11/16	1
30VM-6083	F-375-C	4 7/8	2 1/2	2	1	1 3/8	1	3/8	11/16	1
30VM-9083	F-562-C	5 1/4	2 7/8	2 5/8	15/16	1 3/4	15/16	3/8	11/16	1 1/2
60VM-4073	F-250-C	4 3/4	2 3/8	2	1	1 1/16	11/16	3/8	11/16	1
60VM-6083	F-375-C	5 1/8	2 3/4	2	1	1 7/16	1 1/16	3/8	11/16	1
60VM-9083	F-562-C	5 13/32	3 1/32	2 5/8	15/16	2 23/32	1 9/32	3/8	11/16	1 1/2



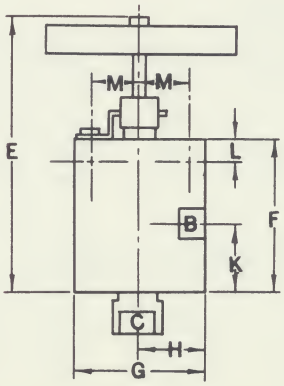
THREE-WAY—TWO-STEM MANIFOLD VALVE

Cat. No.	A-B-C	E	F	G	H	J	K	L	M	Block Thk.
10V-2005	W-125	4 3/8	2	1 3/8	11/16	1	11/16	1/4	1/2	1/2
10V-4075	W-250	8 1/8	3 3/8	2	1	1 11/16	1 3/32	3/8	11/16	1
10V-6075	W-375	8 1/8	3 3/8	2	1	1 11/16	1 3/32	3/8	11/16	1
10V-4085	W-250	8 1/8	3 3/8	2	1	1 11/16	1 3/32	3/8	11/16	1
10V-6085	W-375	8 1/8	3 3/8	2	1	1 11/16	1 3/32	3/8	11/16	1
30VM-4075	F-250-C	7 13/16	3 1/16	2	1	1 17/32	1 1/8	3/8	11/16	1
30VM-6075	F-375-C	8	3 1/4	2	1	1 5/8	1 1/8	3/8	11/16	1
30VM-9075	F-562-C	8 1/2	3 3/4	2 5/8	15/16	1 7/8	1 1/8	3/8	11/16	1 1/2
30VM-4085	F-250-C	7 13/16	3 1/16	2	1	1 17/32	1 1/8	3/8	11/16	1
30VM-6085	F-375-C	8	3 1/4	2	1	1 5/8	1 1/8	3/8	11/16	1
30VM-9085	F-562-C	8 1/2	3 3/4	2 5/8	15/16	1 7/8	1 1/8	3/8	11/16	1 1/2
60VM-4075	F-250-C	8 3/16	3 7/16	2	1	1 23/32	1 5/16	3/8	11/16	1
60VM-6075	F-375-C	8 1/2	3 3/4	2	1	1 7/8	1 5/16	3/8	11/16	1
60VM-9075	F-562-C	8 7/8	4 1/8	2 5/8	15/16	2 1/16	1 5/16	3/8	11/16	1 1/2



TWO-WAY ANGLE VALVE—METERING STEM

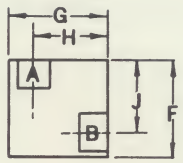
Cat. No.	B - C	E	F	G	H	K	L	M	Block Thk.
30VR-4872	F-250-C	3 13/16	2	2	1	7/8	3/8	11/16	1
60VRM-4872	F-250-C	4 3/4	2 5/8	2	1	1 5/16	3/8	11/16	1
10VR-2872	W-125	3 3/8	1 9/16	1 3/8	7/8	5/8	3/16	3/8	3/4



DIMENSIONS

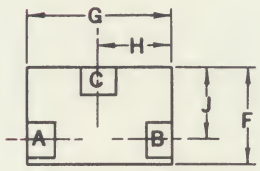
ELBOWS

Cat. No.	A - B	F	G	H	J	Block Thk.
SL-2200	W-125	1	1	¾	¾	½
SL-4400	SW-250	1 3/16	1 3/16	⅞	⅞	⅝
SL-6600	SW-375	1⅜	1⅜	1	1	¾
SL-8800	SW-500	1¾	1¾	1¼	1¼	1
CL-4400	F-250-C	1	1¼	⅞	⅝	¾
CL-5500	F-312-C100	2	2¼	1¾	1⅜	1¼
CL-6600	F-375-C	1½	1¾	1¼	1	1
CL-9900	F-562-C	1⅞	2⅝	1⅞	1⅛	1½
CLX-9900	SF-562-CX	1¾	1¾	1¼	1¼	1



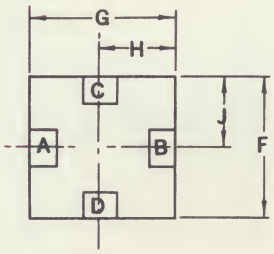
TEES

Cat. No.	A - B - C	F	G	H	J	Block Thk.
ST-2220	W-125	1	1⅜	11/16	¾	½
ST-4440	SW-250	1 3/16	1¾	⅞	⅞	⅝
ST-6660	SW-375	1⅜	2	1	1	¾
ST-8880	SW-500	1¾	2½	1¼	1¼	1
CT-4440	F-250-C	1¼	2	1	⅞	1
CT-5550	F-312-C100	2¼	2¾	1⅜	1⅝	1¼
CT-6660	F-375-C	1 9/16	2	1	1 1/16	1
CT-9990	F-562-C	2⅛	2⅝	1 5/16	1⅜	1½
CTX-9990	SF-562-CX	1¾	2½	1¼	1¼	1



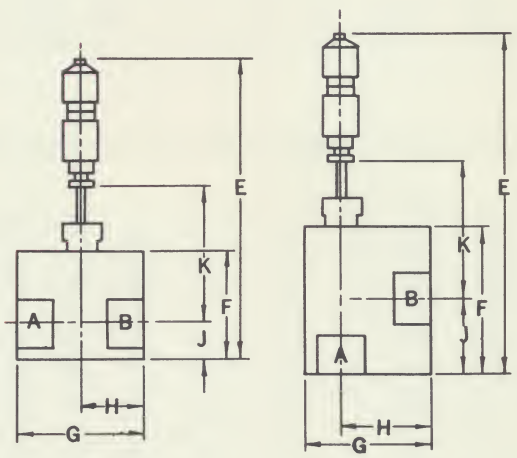
CROSSES

Cat. No.	A - B - C - D	F	G	H	J	Block Thk.
SX-2222	W-125	1½	1⅜	11/16	¾	½
SX-4444	SW-250	1¾	1¾	⅞	⅞	⅝
SX-6666	SW-375	2	2	1	1	¾
SX-8888	SW-500	2½	2½	1¼	1¼	1
CX-4444	F-250-C	1¼	2	1	⅝	1
CX-5555	F-312-C100	2¾	3	1½	1⅜	1¼
CX-6666	F-375-C	2⅛	2	1	1 1/16	1
CX-9999	F-562-C	2¾	2⅝	1 5/16	1⅜	1½
CXX-9999	SF-562-CX	2½	2½	1¼	1¼	1



PENCIL THERMOCOUPLE BLOCK—ANGLE TYPE

Cat. No.	A - B	E	F	G	H	J	K	Block Thk.
STC-2201	W-125	7	1⅜	1	¾	11/16	3⅝	½
STC-4401	SW-250	7 3/16	1¾	1 3/16	⅞	⅞	3⅝	⅝
STC-6601	SW-375	7 5/16	2	1⅜	1	1	3⅝	¾
STC-8801	SW-500	7 9/16	2½	1¾	1¼	1¼	3⅝	1
CTC-4401	F-250-C	6½	2 7/16	2	⅞	⅜	3 3/16	1
CTC-6601	F-375-C	6 29/32	2 13/16	2	1¼	1	3 3/16	1
CTC-9901	F-562-C	7	2 15/16	2⅝	1⅞	1⅛	3 3/16	1½
CTCX-9901	SF-562-CX	6 15/16	2½	1¾	1¼	1¼	3	1

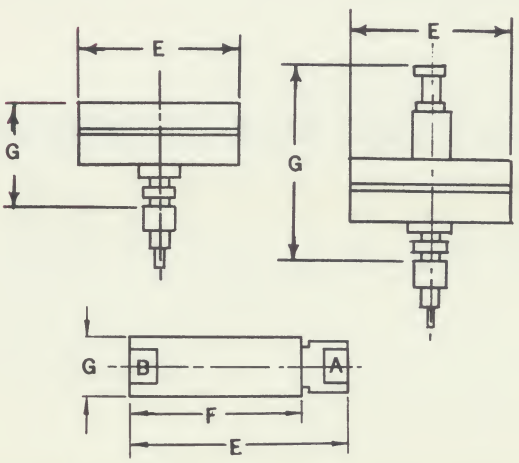


PENCIL THERMOCOUPLE BLOCK—STRAIGHT THRU TYPE

Cat. No.	A - B	E	F	G	H	J	K	Block Thk.
STC-2200	W-125	6 9/16	1	1⅜	11/16	¼	3⅝	½
STC-4400	SW-250	6⅝	1 3/16	1¾	⅞	5/16	3⅝	⅝
STC-6600	SW-375	6 11/16	1⅜	2	1	⅜	3⅝	¾
STC-8800	SW-500	6 13/16	1¾	2½	1¼	½	3⅝	1
CTC-4400	F-250-C	6¼	2	2	1	7/16	3 3/16	1
CTC-6600	F-375-C	6⅜	2⅛	2	1	9/16	3 3/16	1
CTC 9900	F-562-C	6 9/16	2 5/16	2⅝	1 5/16	¾	3 3/16	1½
CTCX-9900	SF-562-CX	6 3/16	1¾	2½	1¼	½	3	1

AIR OPERATORS

		BENCH SCALE	LIGHT DUTY	MEDIUM DUTY	HEAVY DUTY
AIR TO CLOSE	G	3⅜	4¼	7⅜	10
	E	2	2⅜	3¾	4½
AIR TO OPEN	G	3⅜	4¼	7⅜	10
	E	3⅞	5⅛	8	8



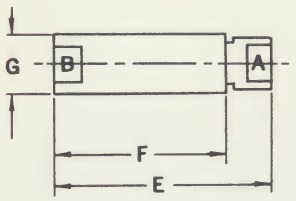
GAUGE SURGE CHECK VALVE

Cat. No.	A	B	E	F	G
SGK-2402	¼ N.P.T.	W-125	2 13/16	1⅞	¾
SGK-4402	¼ N.P.T.	SW-250	2 13/16	1⅞	¾
SGK-6402	¼ N.P.T.	SW-375	2 15/16	2	⅞

DIMENSIONS

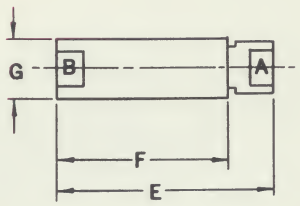
BALL CHECK VALVE

Cat. No.	A - B	E	F	G
SB-2201	W-125	2 1/4	1 3/4	5/8
SB-4401	SW-250	3	2 3/8	13/16
SB-6601	SW-375	3 1/8	2 1/2	1
SB-8801	SW-500	3 11/16	2 7/8	1 3/16
CB-4401	F-250-C	3 5/16	2 1/2	1 3/16
CB-6601	F-375-C	3 3/4	2 3/4	1 3/16
CB-9901	F-562-C	4 19/32	3 3/8	1 1/2
CBX-9901	SF-562-CX	4 5/8	3 1/2	1 3/8



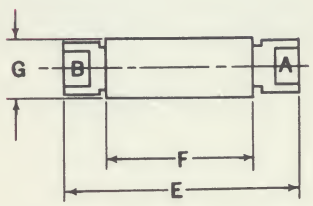
GAUGE OR LINE SURGE CHECK VALVE

Cat. No.	A - B	E	F	G
SK-2202	W-125	2 1/4	1 3/4	5/8
SK-4402	SW-250	3	2 3/8	13/16
SK-6602	SW-375	3 1/8	2 1/2	1
SK-8802	SW-500	3 11/16	2 7/8	1 3/16
CK-4402	F-250-C	3 5/16	2 1/2	1 3/16
CK-6602	F-375-C	3 3/4	2 3/4	1 3/16
CK-9902	F-562-C	4 5/8	3 3/8	1 1/2
CKX-9902	SF-562-CX	4 5/8	3 1/2	1 3/8



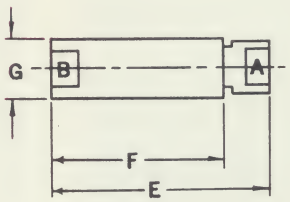
LINE FILTERS

Cat. No.	A - B	E	F	G
SLF-2200	W-125	2 5/16	1 1/4	5/8
SLF-4400	SW-250	2 15/16	1 11/16	13/16
SLF-6600	SW-375	2 15/16	1 11/16	1
SLF-8800	SW-500	3 9/16	1 15/16	1 3/16
CLF-4400	F-250-C	4 3/4	3	1 1/8
CLF-6600	F-375-C	5 1/8	3	1 1/8
CLF-9900	F-562-CX	5 13/16	3 3/8	1 3/8
CLFX-9900	SF-562-CX	4 15/16	2 11/16	1 3/8



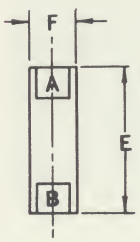
O-RING CHECK VALVE

Cat. No.	A - B	E	F	G
SKO-2200	W-125	2 1/4	1 3/4	5/8
SKO-4400	SW-250	3	2 3/8	13/16
SKO-6600	SW-375	3 1/8	2 1/2	1
SKO-8800	SW-500	3 11/16	2 7/8	1 3/16
CKO-4400	F-250-C	3 5/16	2 1/2	1 3/16
CKO-6600	F-375-C	3 3/4	2 3/4	1 3/16
CKO-9900	F-562-C	4 5/8	3 3/8	1 1/2
CKOX-9900	SF-562-CX	4 5/8	3 1/2	1 3/8



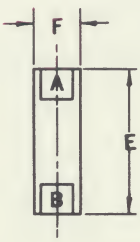
COUPLINGS

Cat. No.	A	B	E	F
15F-2211	W-125	W-125	1 1/4	1/2
6F-4422	SW-250	SW-250	1 5/8	5/8
6F-6622	SW-375	SW-375	1 3/4	3/4
4F-8822	SW-500	SW-500	2	1
60F-4433	F-250-C	F-250-C	1 3/8	3/4
100F-5533	F-312-C100	F-312-C100	2 5/8	1 1/8
60F-6633	F-375-C	F-375-C	1 3/4	1
60F-9933	F-562-C	F-562-C	2 3/16	1 3/8
15F-9966	SF-562-CX	SF-562-CX	2 1/8	1



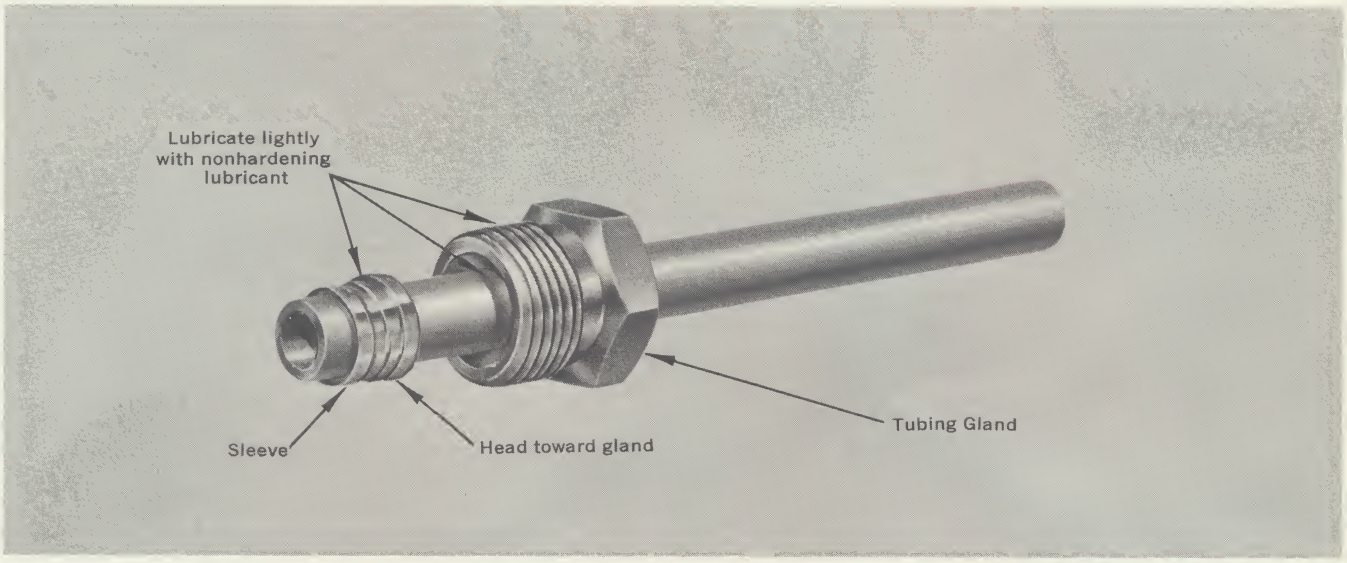
REDUCING COUPLINGS

Cat. No.	A	B	E	F
6F-2412	W-125	SW-250	1 7/16	5/8
6F-2612	W-125	SW-375	1 1/2	3/4
4F-2812	W-125	SW-500	1 5/8	1
6F-4622	SW-250	SW-375	1 11/16	3/4
4F-4822	SW-250	SW-500	1 7/8	1
4F-6822	SW-375	SW-500	1 15/16	1
60F-4533	F-250-C	F-312-C100	2	1
60F-4633	F-250-C	F-375-C	1 5/8	1
60F-4933	F-250-C	F-562-C	1 3/4	1 3/8
60F-5633	F-312-C100	F-375-C	2 1/4	1
60F-5933	F-312-C100	F-562-C	2 1/2	1 3/8
60F-6933	F-375-C	F-562-C	2	1 3/8

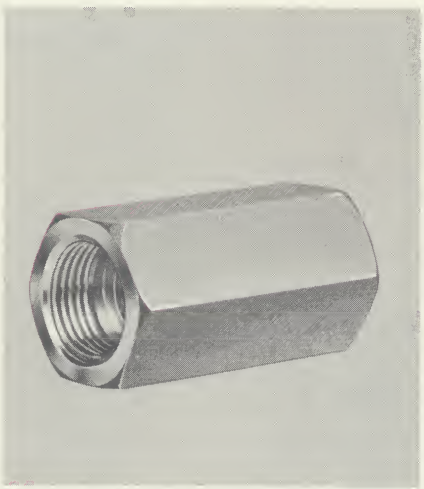


INSTALLATION AND MAINTENANCE
ERMETO CONNECTIONS

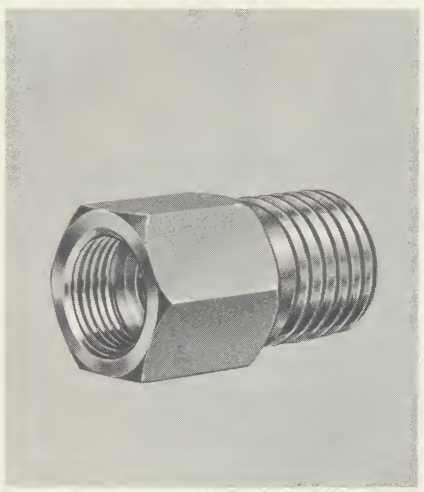
COMPONENTS



IMPORTANT! *Only cold drawn, seamless annealed tubing (Brinell hardness 125-150) of sufficient wall thickness for the intended service should be used for Ermeto connections. See page 27.*



Make-up Mandrel—Conventional Ermeto Connections



Make-up Mandrel—Male and Female Slim-Line Ermeto Connections

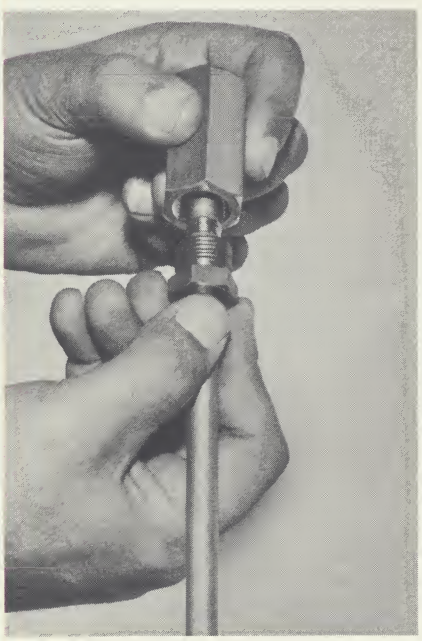
Make-up Mandrels with specially hardened and polished seats are used to seat Ermeto sleeves on tubing prior to final assembly in system fitting. Fittings are more susceptible to damage during sleeve make-up than during final assembly and the use of mandrels eliminates this hazard.

ORDERING INFORMATION

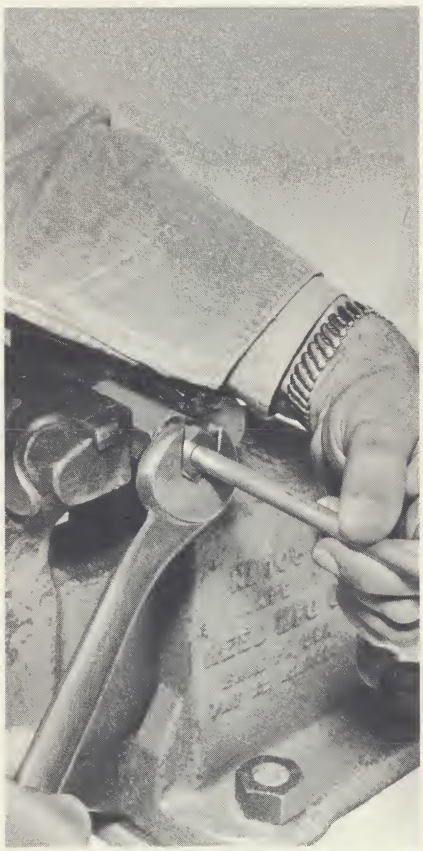
Mandrel Catalog Number	For These Connections
S125M	⅛″ Conventional Ermeto ⅛″ Male and Female Slim-Line Ermeto
S250M	¼″ Male and Female Slim-Line Ermeto
S375M	⅜″ Male and Female Slim-Line Ermeto
S500M	½″ Male and Female Slim-Line Ermeto
E2537M	¼″ & ⅜″ Conventional Ermeto

SLEEVE MAKE-UP PROCEDURE

1. Cut tubing to desired length. Remove burrs. (The Seat Reamer shown on page 45 is useful for removing burrs from the tubing bore.) Be sure to allow the following extra lengths for engagement within connection: ½″ for ⅛″ OD tubing; ¾″ for ¼″ and ⅜″ OD tubing; ⅞″ for ½″ OD tubing.



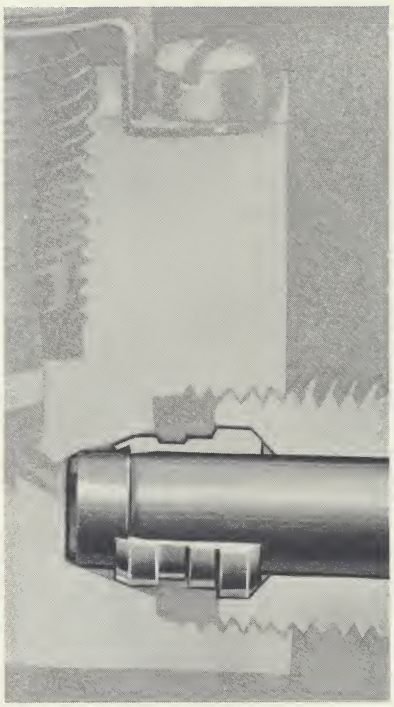
2. Slip gland and then sleeve onto tubing. Be sure head of sleeve is toward gland as shown under "Components."



3. Make certain tubing is bottomed in mandrel (or fitting if mandrel is not used). Then, turn gland into connection against sleeve until "finger-tight." Use an *open-end* wrench of appropriate size (adjustable wrenches are *not* recommended as overtightening may result). Note the starting position of wrench and tighten gland approximately 1¼ turns. If torque wrench is available, the following values may be used:

TUBING SIZE	TORQUE (ft. lbs.)
⅛″ OD x 1/16″ ID	5
¼″ OD x ⅛″ ID	50
⅜″ OD x ¼″ ID	55
½″ OD x ⅜″ ID	60

4. Disassemble connection, inspect sleeve (and fitting, if mandrel is not used) for burrs or galling. If either are present final assembly will not be satisfactory and components must be replaced.



The cutaway illustration above indicates the condition of the sleeve and tubing after completion of the "sleeve seating" procedure. The sleeve will have cut into the tubing as it moved forward into the tapered seat, upsetting material ahead of it and establishing a shoulder on the tubing to provide positive mechanical support for the tubing end-load. Note carefully! A properly seated sleeve cannot be displaced back and forth along the tubing but *it can be rotated freely around the tubing.*

FINAL ASSEMBLY

After completion and inspection of "Sleeve Make-up," final assembly is accomplished by inserting tubing with sleeve and gland into system fitting and tightening "finger-tight." Then gland is tightened, with appropriate *open-end* wrench, approximately ⅜ of a turn for a gas tight seal. If a torque wrench is available the values shown above, under "Sleeve Make-up," may be used for final assembly.

NOTE: After frequent reassemblies it may take less than ⅜ of a turn to effect a gas tight seal. As little as ⅛ of a turn may be sufficient, and damage due to overtightening may result if more is attempted. Torque values, however, will tend to remain constant.

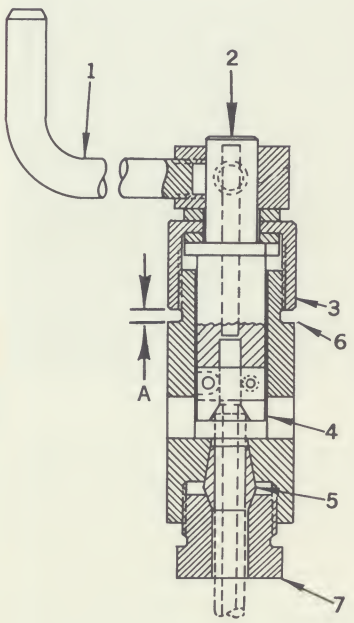
DO NOT OVERTIGHTEN.

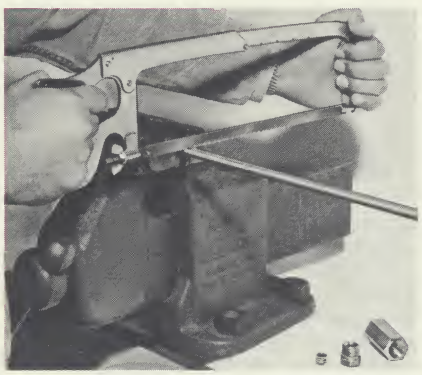
INSTALLATION AND MAINTENANCE
AE-CONE CONNECTIONS

TUBING END PREPARATION • ASSEMBLY • RESEATING FEMALE CONES

CONING HIGH-PRESSURE TUBING

As illustrated on page 29, two sizes of tools are available for coning the several sizes of tubing used in AE-Cone systems. Interchangeable cutters and collets are offered for each size tool. For satisfactory coning of hard-drawn tubing, the following procedure should be carefully followed.

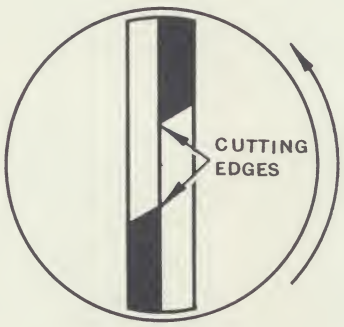




1. Clamp tubing in vise and cut to proper length with hacksaw. (In general, tubing cutters are not satisfactory.) Although the cone cutting tool will "square-off" the end of the tubing, the more nearly square the hacksaw cut is, the better. Allow the following approximate lengths for engagement within connection: ½" for SF250C and F250C; ⅝" for SF375C; 11/16" for F375C; ⅞" for SF562CX, and F562C; 1¼" for F312C100.

2. Remove burrs from end of tubing with file.

3. Check to see that proper size cutters (4) and collet (5) are in tool.



4. Make certain cutters (4) are in correct position for cutting. See sketch.

5. Set feed nut (3) so that dimension "A" is:

5/32" for ¼" tubing
3/16" for 5/16" tubing
3/16" for ⅜" tubing
9/32" for 9/16" tubing

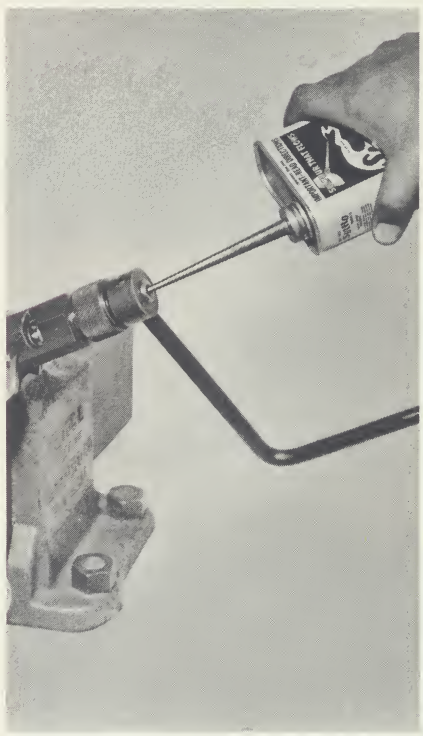
6. Place tool in vise, preferably in vertical position if short length of tubing is being coned, but in any event with the operating end of tool above the horizontal to ensure lubricant flow to cutters and cone.

7. Slide tubing through collet (5) until end contacts cutting blades (4) which have been positioned as in step No. 5.

8. Tighten collet nut (7) just enough to slightly grip tubing.

9. Turn feed nut (3) counterclockwise to back cutters (4) away from tubing.

10. Tighten collet nut (7) with wrench until tubing is clamped firmly in position.



11. Apply a generous amount of a good grade of sulphur base cutting oil through lubricant opening in top end of cutter support (2). (It is imperative that cutting oil be used freely throughout the cutting operation.)

12. Turn feed nut (3) clockwise until cutter blades (4) contact end of tubing lightly.

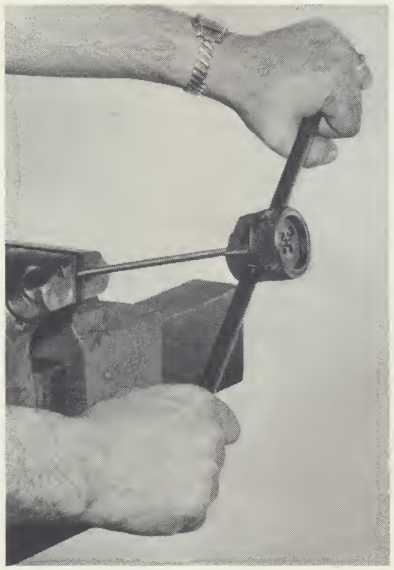
13. Rotate cutter handle (1) in a clockwise direction while *simultaneously* turning the feed nut (3) in clockwise direction at a rate to ensure that cutters are taking a light cut *at all times.* (Insufficient feed will cause rubbing, work-hardening and imperfectly formed cones.)

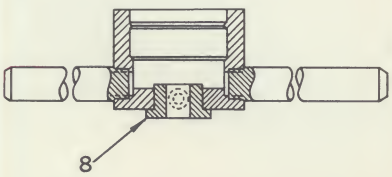
14. Continue step 13 until feed nut (3) bottoms on housing (6).

15. Rotate cutters through several revolutions to face-off end of cone.

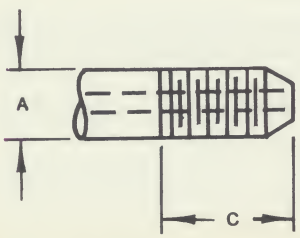
THREADING HIGH-PRESSURE TUBING—PROCEDURE

(To be done only after coning)





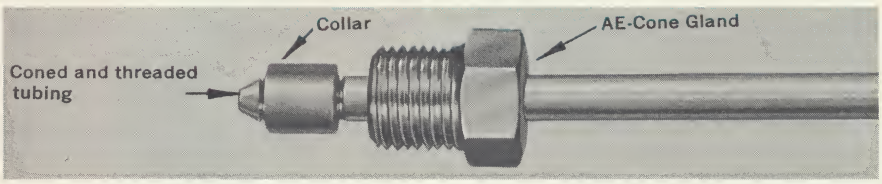
1. Clamp tubing in vise.
2. Slide stock guide (8) over tubing until die contacts end of tubing.
3. Apply sulphur base cutting oil generously to die and end of tubing.
4. Apply pressure against end of tubing with die to start cutting action of die and rotate stock *counterclockwise* until threads of following lengths have been cut.



GENERAL DIMENSIONS FOR CONING HIGH-PRESSURE TUBING

A	C	THREAD
1/4"	9/16"	1/4"—28L.H.
5/16"	13/16"	5/16"—24L.H.
3/8"	3/4"	3/8"—24L.H.
9/16"	15/16"	9/16"—18L.H.

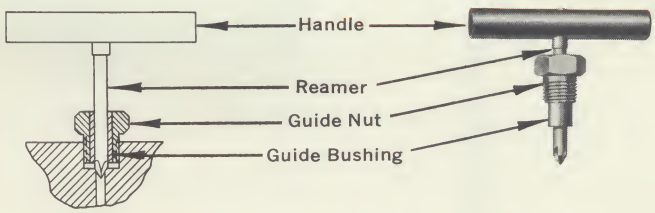
ASSEMBLY PROCEDURE



1. Clean all components.
2. Slip gland on tubing as illustrated.
3. Thread collar onto tubing until one to two threads are exposed between collar and cone.
4. Insert tubing into connection and engage gland thread in connection.
5. Turn gland by hand until snug or "finger-tight."
6. Tighten gland with appropriate open-end wrench to the following torque values:

CONNECTION	PRESSURE (psi)	TORQUE (ft. lbs.)	APPROX. NO. TURNS
SF250C	15000	12	1/6
SF375C	15000	25	1/6
SF562CX	15000	110	1/6
F250C	30000	25	1/6
F375C	30000	70	1/6
F562C	30000	110	1/6
F250C	60000	25	1/6
F375C	60000	70	1/6
F562C	60000	110	1/6
F312C100	100000	70	1/6

RESEATING FEMALE CONE SEATS



1. Clamp fitting in vise.
2. Thread gland nut into connection and tighten to 10 ft. lbs.
3. Apply good grade of sulphur base cutting oil generously through opening in nut.
4. Insert reamer through guide bushing and press down firmly while rotating clockwise approximately two full turns, relieving pressure gradually toward end of second turn.
5. Remove reamer guide nut and bushing and inspect cone seat.
6. Repeat steps 2, 3, 4 and 5, if necessary, until cone surface has been restored and finish is smooth.
7. Clean fitting thoroughly to remove all chips and dust.

ORDERING INFORMATION—REAMERS AND PARTS

CONNECTION	REAMER COMPLETE	GUIDE NUT	GUIDE BUSHING	REAMER	HANDLE
SF250C	P-270-CS	20-7310-A	0-811-A	P-270	20-181-C
F250C	P-270-C	10-232-A	P-287	P-270	20-181-C
F312C100	P-271-C100	20-7310-D	0-822-A	P-271	20-181-C
F375C	P-271-C	10-232-B	P-288	P-271	20-181-C
SF375C	P-271-CS	20-7310-B	0-822-A	P-271	20-181-C
F562C	P-272-C	10-232-C	P-289	P-272	20-181-C
SF562CX	P-896-CS	20-7310-C	0-833-A	P-896	20-181-C

TWO-PIECE STEMS
ASSEMBLY AND ADJUSTMENTS

COMPONENTS

TOOLS REQUIRED

Two 7/32" open-end wrenches
Vise—any size.

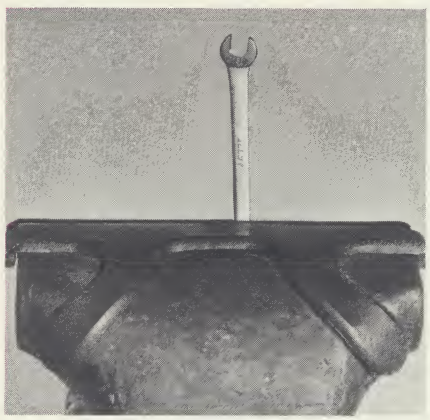
PROCEDURE

1. Clean thrust washers and all surfaces on other parts which mate with thrust washers with clean cloth.

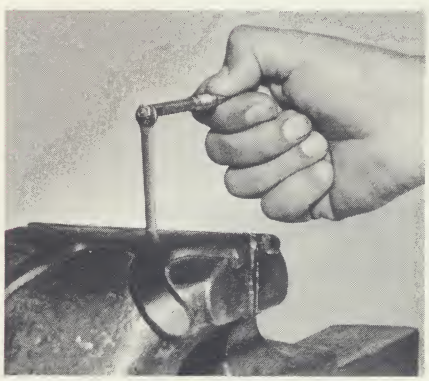
2. Apply non-hardening lubricant lightly to both faces of thrust washers.

3. Assemble in order shown in "Components" photo above.

To stem tip add:
a. First thrust washer
b. Stem sleeve
c. Second thrust washer
d. Turn hex nut into place with fingers.



4. Place one 7/32" open-end wrench in vise as in photo.



5. Hold assembly with hex nut in wrench. Turn stem tip as tightly as possible *but only with the fingers.* Do not use tool to grip stem tip!

6. With hex nut still in open-end wrench, thread lock nut on with fingers and tighten with second 7/32" open-end wrench.

CAUTION: Be careful not to over-tighten as stem tip threaded section can be twisted off if too much torque is applied. If stem has been correctly assembled and tightened it will *not* be possible to rotate stem sleeve relative to stem tip with the fingers. When assembled in valve, however, stem sleeve will rotate independently of stem tip.

RE-ADJUSTING TWO-PIECE STEM IN SYSTEM—PROCEDURE

Although not generally required, it is possible to re-adjust AE Two-Piece Stems without removing from valve or system.

1. Open valve approximately three turns.

2. Remove lock nut, hex nut and second thrust washer.

3. Lubricate stem tip thread and both sides of thrust washer with non-hardening lubricant.

4. Close valve approximately one turn.

5. Remove handle.

6. Place second thrust washer over stem tip thread.

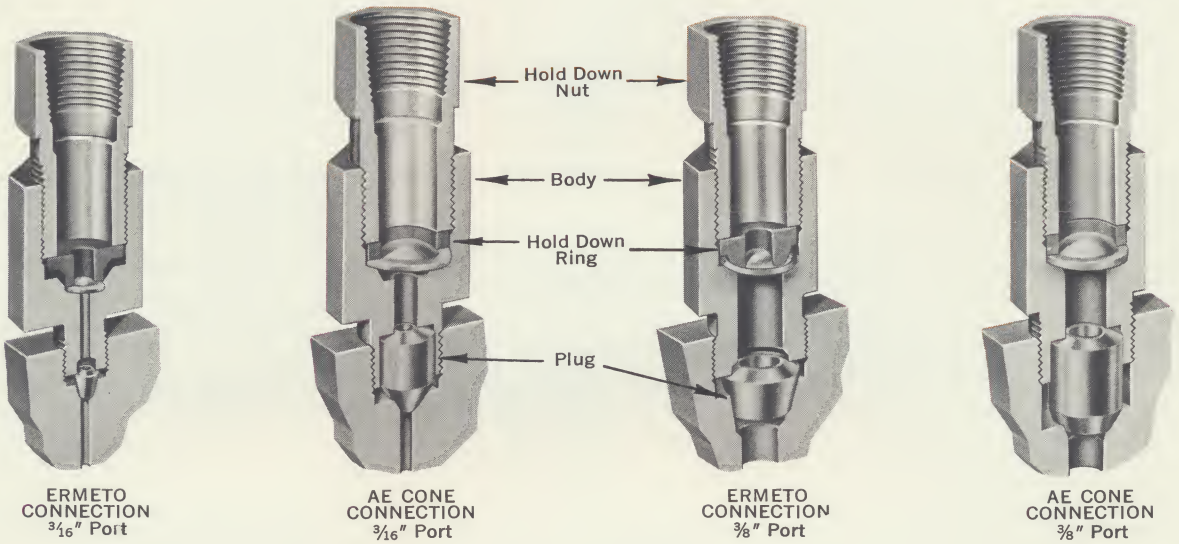
7. Thread hex nut on stem tip thread and tighten as firmly as possible *but only with the fingers.*

8. Hold hex nut with 7/32" open-end wrench, thread on lock nut and tighten with second open-end wrench.

9. Replace handle.

When handle is turned, stem tip and nuts should not turn.

INSTALLATION AND MAINTENANCE
UNIVERSAL SAFETY HEAD ASSEMBLIES



Universal Safety Heads employ a choice of several disc sizes in flat or 30-degree angular seat types interchangeably in the one assembly. CAUTION: Proper hold-down ring must be used with each size and type disc.

RUPTURE DISC INSTALLATION

1. Remove hold-down nut from body of assembly.

2. Remove hold-down ring from body of assembly.

3. Clean all parts thoroughly.

4. Clamp safety head body in vise.

5. Insert rupture disc into body of assembly; *in all cases* with the convex surface or "bubble" upward toward hold-down nut opening.

6. Make certain you have correct hold-down ring.

7. Lubricate hold-down nut thread and both surfaces of hold-down ring with non-hardening lubricant.

8. Insert proper hold-down ring on top of rupture disc as follows:

a. For flat discs and rings, the side of hold-down ring which is radiused at the inner opening goes down against disc.

b. For 30-degree angular seat discs and rings, the angular surface of hold-down ring goes down against corresponding surface of disc.

9. Thread hold-down nut into body and tighten.

TO INSTALL IN SYSTEM FITTING

1. Insert proper size plug in fitting with shallow cone surface upward toward opening.

2. Thread Universal Safety Head Assembly into fitting and tighten.

INSTALLATION AND MAINTENANCE
RE-PACKING AE VALVES

Friction between the stem and packing will, in time, cause the packing to wear. After the packing gland adjustment has been used up, bubble-tight operation can be restored by the installation of a new packing ring.

RE-PACKING PROCEDURE

1. Clamp valve in vise.

2. Rotate handle counterclockwise as far as it will go.

3. Remove or loosen locking device.

4. Loosen and remove packing gland and stem from body.

5. Remove all packing and washers from valve stuffing box.

6. Clean all parts thoroughly.

7. Slip new parts on lower end of valve stem in sequence shown in spare parts illustration.

8. Lubricate internal and external packing gland threads with non-hardening lubricant.

9. Make certain stem is still fully retracted in packing gland.

10. Thread packing gland into body and tighten to the following torque values:

VALVE	TORQUE (ft.lbs.)
All 1/8" Valves	15
All 1/4" Ermeto Valves	25
All 3/8" Speed Valves	25
All 3/8" & 1/2" SpaceSaver Valves	40
All Slim-Line 9/16 x 5/16" Valves	85
All AE-30 Valves	40
All AE-60 & AE-100 Valves	50

INSTALLATION AND MAINTENANCE
AIR-OPERATED VALVES

AIR-TO-CLOSE TYPE

CAUTION: Before any adjustment of the packing gland, the stem must be lifted away from the valve seat and maintained in this position during adjustment. This is accomplished by relieving all air pressure to the operator air inlet (⅛" NPT opening on top of operator). Failure to do this will cause the stem tip to be rotated against seat and damaged.

PACKING ADJUSTMENT PROCEDURE

1. Relieve all pressure in valve body.

2. Relieve all pressure to operator air inlet.

3. Loosen locking device, if present.

4. *Using wrench*, tighten packing gland approximately 1/16 turn. *NOTE:* Do not attempt to tighten packing gland by grasping and turning diaphragm operator housing.

5. Pressurize valve and check for leaks.

6. If leak is still present, relieve pressure from valve body and repeat step No. 4.

7. Re-install packing gland locking device, if present.

AIR-TO-OPEN TYPE

CAUTION: Before any adjustments are made on the operator or packing gland, the stem must be lifted away from its seat in the valve and maintained in this position during adjustment. This is accomplished by applying *maximum* air pressure to the operator air inlet connection (⅛" NPT connection in lower head). Check by blowing air through valve to make sure it is open. Failure to do this will cause the stem tip to be rotated against the seat and damaged.

PACKING ADJUSTMENT PROCEDURE

1. Relieve all pressure to valve body.

2. Apply and maintain maximum air pressure to operator air inlet.

3. Loosen packing gland locking device, if present.

4. *Using wrench*, tighten packing gland approximately 1/16 turn. *NOTE:* Do not attempt to tighten packing by grasping and turning diaphragm operator housing.

5. Pressurize valve and check for leaks.

6. If leak is still present, repeat step No. 4 and step No. 5 until leak stops.

7. Relieve air pressure to operator air inlet.

AIR INLET LOCATION ADJUSTMENT PROCEDURE

If air inlet connection to operator is inconveniently located after valve is installed in line, it may be relocated by the following procedure. Special attention should be paid to caution note in step No. 3 as failure to observe it may cause inadequate thread engagement between the packing gland adapter and the diaphragm housing and consequent dangerous condition or accident.

1. Relieve all pressure to valve body.

2. Apply and maintain maximum air pressure to operator air inlet.

3. Loosen air operator lock nut and turn down until it "bottoms" on hex shoulder on packing gland. Looking down on top of diaphragm housing rotate housing *clockwise* to desired position.

NOTE: NEVER ROTATE HOUSING COUNTER-CLOCKWISE to locate air inlet.

4. Firmly tighten operator lock nut with wrench while holding operator housing from rotating.

SPRING ADJUSTMENT PROCEDURE

If the valve is to be used at a pressure lower than that for which spring was adjusted at the factory, it is possible to reduce the operating air pressure requirement by readjustment of spring compression. If it is to be used at a pressure higher than that for which spring was adjusted at factory, it will be necessary to adjust spring compression for satisfactory operation. Either objective can be achieved by following the procedure below.

1. Refer to Air Operator Selector Chart, page 12, to determine approximate required air pressure for intended service conditions.

2. Apply air pressure determined in step No. 1 to Air Operator inlet connection.

3. Make temporary reduced pressure air connection to upstream connection on valve, leaving downstream connection or connections open.

NOTE: **(a.)** If air leaks through valve, spring may have been set at factory for pressure lower than intended service conditions, and spring adjustment may require tightening to close valve against operating air pressure.

(b.) If air does not leak through valve, spring was probably set at factory for pressure higher than intended service and spring adjustment may be loosened.

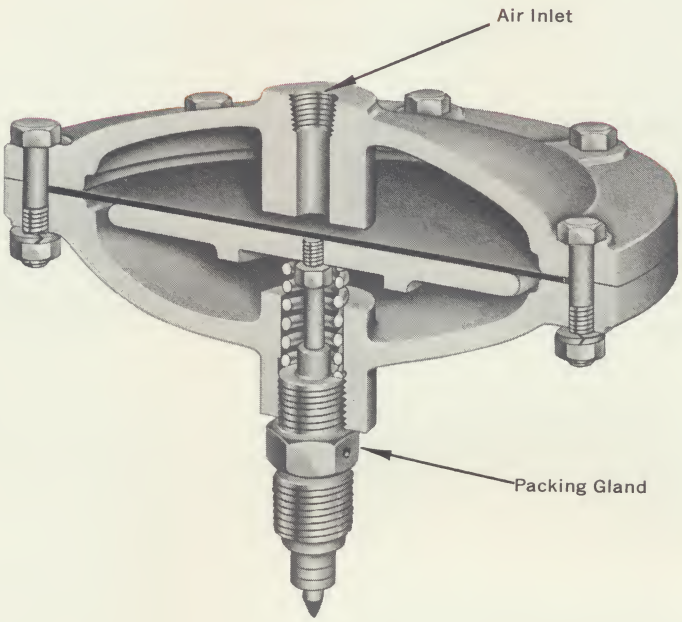
4. Loosen lock nut on spring adjustment bolt.

5. Case "a", step No. 3: Slowly tighten spring adjustment bolt until air leak through valve is cut off. Then back off adjustment slowly until valve opens fully. Case "b," step No. 3: Slowly loosen spring adjustment bolt until valve opens fully.

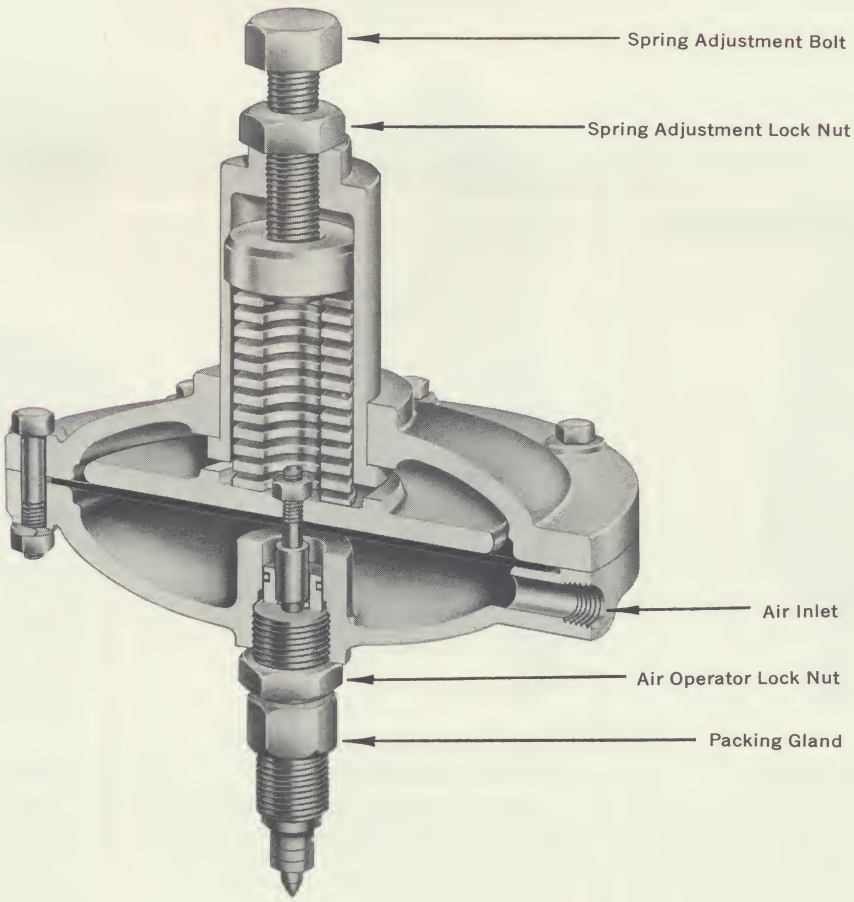
6. Tighten spring adjustment lock nut.

INSTALLATION AND MAINTENANCE
AIR-OPERATED VALVES

AIR-TO-CLOSE TYPE



AIR-TO-OPEN TYPE



HIGH PRESSURE PRODUCTION VALVES

Autoclave Engineers' production valves have proven their reliability in operation at leading chemical producers. Not simply valves, but rather precision equipment, they insure optimum productivity, ease of operation and safety in such applications as ammonia, urea and polyethylene production, and in high pressure air handling and hydraulic systems.

Autoclave high pressure production valves are the result of our years of experience in high pressure work. They are available in working pressures of up to 6,000 psi in sizes ranging from ⅝″ to 3″. They can be furnished with manual, air or motor operation.

MINIMUM PRESSURE DROP . . . LONG-LASTING CONSTRUCTION

Features of Autoclave Engineers' production valves include:

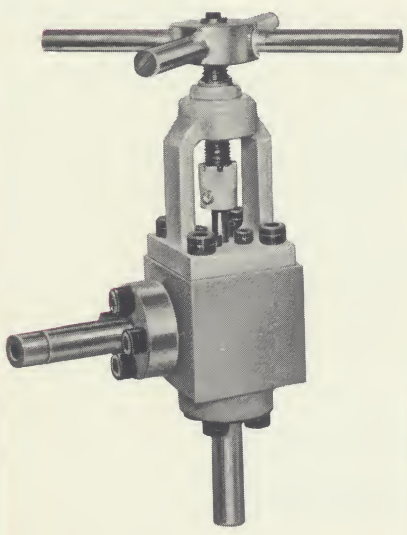
Clean flow lines, with minimum pressure drop, are the result of internal valve design.

Replaceable seat allows use of abrasion-resistant materials, which result in longer, maintenance-free service.

Non-rotating stem allows for non-grinding action on the closure, prolonging the life of both valve stem and seat.

Teflon-asbestos packing provides chemical resistance while minimizing leakage.

Materials of construction are rugged forgings, selected to provide long life consistent with the particular corrosion-resistant requirements. Valves are made of stainless steel or high strength alloy steel, or of Inconel, Monel or Hastelloy if required.

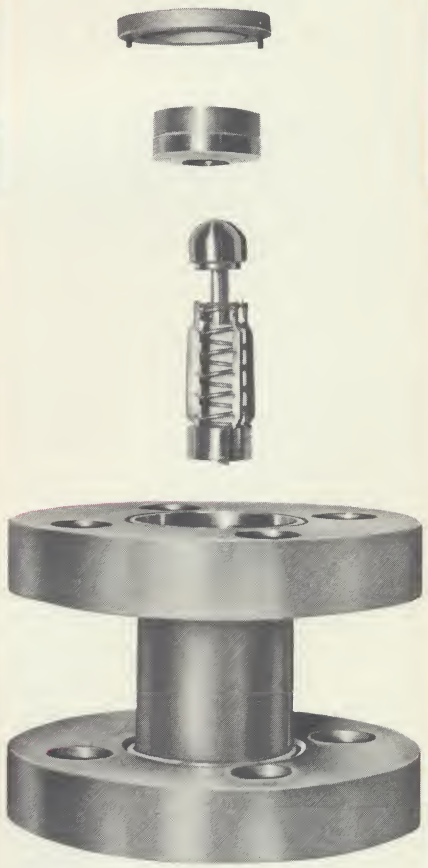


HAND-OPERATED VALVE

This valve was instrumental in the successful development of large-scale ammonia processing, and it remains a reliable mainstay in such plants. Normally hand-operated, it can also be furnished with motor actuation.

AIR-OPERATED VALVE WITH MANUAL OVERRIDE

With air actuation, the same closing forces are used each time the valve is operated. This prolongs stem and seat life. The valve can be opened or closed manually in the event of air failure, and it can be installed in a remote location.



CHECK VALVES (non-return)

The spherical plug in this valve promotes the advantages of the ball check, and the spring loading with guides allows the valve to be used in either horizontal or vertical service. The removable seat and ease of disassembly reduce down-time and maintenance costs.

FITTINGS

Autoclave Engineers' fittings receive the same high quality craftsmanship and manufacture as the valves. They are precision machined from bar stock or forgings. Seals are usually of the lens ring design with either flanged or screwed connections.

CATALOG No. 500

HIGH PRESSURE VALVES & FITTINGS

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